APPENDIX XV

RCRA FACILITY CLOSURE PLAN

FOR

SIEMENS ~~WATER TECHNOLOGIES CORP~~INDUSTRY, INC.

PARKER REACTIVATION FACILITY

PARKER, ARIZONA

Revision ~~2~~3
~~July~~ April ~~2011~~2012

APPENDIX XV

RCRA FACILITY CLOSURE PLAN

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~~July~~ April ~~2011~~2012
Revision ~~2~~3

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1.0 INTRODUCTION

The ~~Siemens Water Technologies Corp.~~Siemens Industry, Inc. (~~SWT~~SII) facility accepts spent activated carbon in containers (drums and bulk) from various customers. The spent activated carbon is identified as both hazardous and non-hazardous waste and is managed at the facility in the container storage area, five storage tanks (T1, T2, T5, T6, and T18), and ultimately in the carbon reactivation unit (RF-2).

The Closure Plan for the ~~SWT~~SII facility covers activities related to the eventual closure of the hazardous waste portions of the facility, including all hazardous waste management units (HWMUs) described in the facility's Part A application. The contents of the Closure Plan are based upon, and meet all the criteria set forth in 40 CFR Part 264, Subparts G and H. The goal of this plan is to achieve clean closure. In short, this means that all hazardous wastes will be removed from the RCRA regulated units, and that any releases at or from the units will be remediated so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment. In the event clean closure cannot be achieved, further investigation and remediation work will be performed. Closure of the inactive RF-1 unit is covered in a separate closure plan.

Activities associated with closure of the HWMUs will include treatment and/or removal of all hazardous waste inventory, decontamination of storage and treatment equipment and containment areas, evaluation of decontamination results (including sampling and analysis, as necessary) to ensure that decontamination is adequate, sampling and analysis to determine if soil contamination has occurred, and certification of closure by the facility owner and/or operator and a registered professional engineer. The Closure Plan also includes a cost estimate and financial assurance mechanism for the closure activities. A Sampling and Analysis Plan (SAP) for closure activities, detailing the collection of samples, laboratory analysis, and interpretation of analytical results is included as a separate appendix to the RCRA Part B Permit Application.

Since the closure activities will result in clean closure, the ~~SWT~~SII Parker facility is not considered to be subject to post-closure requirements. However, post-closure requirements may become applicable if soil contamination is found and ~~SWT~~SII is unable to adequately remediate that contamination. Further, there are no underground storage tanks or other treatment and disposal units at the facility that require the submittal of a contingent post-closure plan per 40 CFR 264.118.

There are no land disposal units at the ~~SWT~~SII facility. In addition, no hazardous waste will be left in place. Therefore a “survey plat” and “notice in deed and certification” are not required.

1.1 SITE CONDITIONS

This section describes the existing environment at the location of the facility. Included is information on land features, geologic setting, soils, and water resources. The living resources described include wildlife, vegetation, ecosystems and adjacent agricultural resources. The available cultural, historic and archeological information for the site is also discussed.

1.1.1 CLIMATE

The climate is typical of the Sonoran Desert Region. Winters are mild with minimum temperatures above freezing. The summers are long, hot, and dry with temperatures commonly exceeding 100°F. Average total precipitation is approximately 3.82 inches per year. Precipitation is sporadic, occurring mainly in the time intervals of July -September and December -February. The evaporation rate in this area is 86 inches per year.

1.1.2 WATER

1.1.2.1 Groundwater

Groundwater in the Parker area occurs as both confined and unconfined aquifers. Most of the wells are completed in the Colorado River gravels (alluvium), where unconfined or water table conditions prevail. The Miocene(?) Fanglomerate (gravel deposits at base of mountains) and the lower part of the Bouse Formation contain confined aquifers (artesian). The (?) signifies the geological age is not certain. The city wells in Parker obtain most of their water from the Miocene(?) Fanglomerate. Sources of recharge to the groundwater supply of the area are the Colorado River, precipitation, and underflow from areas bordering the Parker Valley.

In this area, a large amount of the groundwater is lost through evapotranspiration in the Parker area. Direct recharge from precipitation is limited. Loss of water from the Colorado River provides almost 50% of the recharge to the groundwater near Parker.

The groundwater level near Parker is approximately 350 feet. The depth to water in the areas bordering the flood plain ranges from 70 to 300 feet below the land surface.

The production from wells screened in the Colorado River alluvium comes from highly permeable beds of sand and gravel. The Colorado River gravel has the highest transmissivity of the water-bearing sediments in the area. Wells which penetrate sufficient thicknesses of the gravel may produce more than 100 gpm per foot of drawdown (specific capacity).

1.1.2.2 Water Quality

The chemical quality of the groundwater in the Parker area is generally related to the source and movement of the water. The chemical quality of the groundwater is influenced by evaporation, transpiration by native vegetation, former flooding of the river, irrigation developments, and to a marked degree, by the local geology. The groundwater beneath the flood plain is relatively poor in quality, except where irrigation water has entered the aquifer. The shallow groundwater in the non-irrigated part of the valley has twice the mineral content as the Colorado River water.

An explanation for the water composition of many of the wells can be understood by assuming that the groundwater originated as infiltration from the Colorado River associated with irrigation canals, field irrigation, or the river channel. The water composition has been changed by evaporation and concentration.

The results of chemical analyses of water from wells in T.9N.R.20W, near Parker, Arizona show the change. The chloride concentrations for these wells varies between 107 and 208 mg/liter. It is assumed the dissolved minerals now in the ground water must have come from the Colorado River.

1.1.3 GEOLOGY

1.1.3.1 Regional Physiography

The area has a hot, arid climate and is characterized by roughly parallel mountain ranges separated by alluvial basins. The elevation of the basins varies between sea level and 1000 feet. The Colorado River is the major stream in the area. The Colorado River flood plain is between three and nine miles wide. It is less than one mile wide near Parker, and increases to nine miles in the Parker Valley. The flood plain is that part of the Colorado River Valley that has been covered by floods of the Colorado River, prior to construction of Hoover Dam. The elevation of the flood plain near Parker is approximately 360 feet above sea level. The mountains are rugged and rise abruptly from the Colorado River or from alluvial slopes. The highest mountain summits in the region reach an average elevation of around 3300 feet. Between the flood plain and the mountains are piedmont slopes, which are dissected by washes from the mountains and, in a few exceptions, into adjacent and topographically distinct basins. The facility is located on relatively flat terrain (slopes 0-3 percent), and is outside the floodplain.

1.1.3.2 Regional Geology

The geologic units considered important to water resources development near the site are the Miocene(?) Fanglomerate, the Bouse Formation and the alluvium of the Colorado River and its tributaries.

The rocks of the mountains are relatively impermeable, and form the boundaries of the groundwater reservoirs. Interbasin water movement is limited by the impermeable bedrock and limited to groundwater movement in surface sediments, where intermittent surface drainage exits from a basin.

The bedrock includes all rocks older than the Miccene(?) Fanglomerate, and contains sedimentary, metamorphic, and igneous rocks. These Miocene beds are gravel deposits that have eroded from the mountains and filled the basins. The thickness of these beds varies widely across the basins. The Fanglomerate is a potentially important aquifer as near Parker, where wells with a yield of 15 gallons per minute per foot of drawdown have been developed in the Fanglomerate, (Metzger, et al, 1973).

Sediments at the site, identified from geologic maps, are Qe (Eolian Deposits, Holocene) and QTr (Old Fluvial Deposits). Samples taken at the site indicated that only the eolian windblown sand and silt (Qe) are present. The eolian sand is tan to light tan and fine to medium grained, occurring as a deposit on the surface throughout the area.

1.1.3.3 Soils

The descriptions and delineations of soils for the Colorado River Indian Reservation Soil Survey do not always correlate with those of adjacent soil survey maps. The differences are related to differences in mapping intensity, extent of soils within the survey, change in knowledge about soils, and modifications in soil classification. The soil map shows that the soil present at the site is classified as Superstition series, which is a gravelly loamy fine sand that develops on zero to three percent slopes. Samples collected at the site show the same type of material. Chemical analyses of the soil samples revealed no evidence of any existing site contamination. Vegetation supported by Superstition soils is white bursage, creosotebush, turkshead and big gulleta.

2.0 SCOPE OF CLOSURE PLAN

The scope of this Closure Plan includes the closure of the container storage area, as well as the closure of the tanks, associated ancillary equipment, and the surrounding containment area, as necessary. The plan also addresses the closure of the carbon reactivation unit (RF-2), and the surrounding containment, as necessary. Closure of the inactive RF-1 unit is addressed in a separate Closure Plan. A facility diagram is shown in Appendix III of the RCRA Part B Permit Application. Table 2-1 identifies the applicable units covered by this Closure Plan. This plan applies to partial as well as final closure.

In accordance with 40 CFR 264.112(c), this Closure Plan will be reviewed and amended, if necessary, whenever one of the following occurs:

- There is a change in operating plans or facility design that affects the Closure Plan;
- There is a change in the expected year of closure; or
- In conducting closure activities, unexpected events require a modification of the approved Closure Plan.

If ~~SWT~~SII and/or EPA determine~~s~~ that the Closure Plan needs to be amended, ~~it~~ SII will submit a notification for, or request for, a permit modification based on the classification of the modification. An amended Closure Plan will be submitted as part of the permit modification.

TABLE 2-1. EQUIPMENT/ITEMS FOR CLOSURE

Equipment/Item	Use or Purpose	Size/Design Capacity[1]	Hazardous Waste Codes
Container Storage Area	Storage of Containerized Spent Carbon	~80' x 70'; 100,000 gallons	See Below[2]
Tank System T1[3]	Storage of Spent Carbon	8,319 gallons	See Below[2]
Tank System T2[3]	Storage of Spent Carbon	8,319 gallons	See Below[2]
Tank System T5[3]	Storage of Spent Carbon	8,319 gallons	See Below[2]
Tank System T6[3]	Storage of Spent Carbon	8,319 gallons	See Below[2]
Tank System T18[3]	Carbon Reactivation Unit Feed	6,500 gallons	See Below[2]
Tank containment area	Containment of leaks, drip, or spills from tank systems	~31.5' x 30'	See Below[2]
Carbon Reactivation Unit RF-2[4]	Carbon Reactivation	12'-10" dia x 19'-8" high; 3,049 lb/hr	See Below[2]
RF-2 Afterburner[4]	Carbon reactivation off-gas treatment	5' dia (inside refractory) x 33' high	See Below[2]
RF-2 Quench/Venturi[4]	Carbon reactivation off-gas treatment	4'-7" dia x 22' high	See Below[2]
RF-2 Packed bed scrubber[4]	Carbon reactivation off-gas treatment	6' dia x 34' high	See Below[2]
RF-2 Wet electrostatic precipitator[4]	Carbon reactivation off-gas treatment	10' dia x 27' high	See Below[2]
RF-2 induced draft fan[4]	Carbon reactivation off-gas handling	126" dia x 56" wide	See Below[2]
RF-2 stack[4]	Carbon reactivation off-gas handling	3'-8" dia x 110' high	See Below[2]
RF-2 containment area	Containment of leaks, drips, or spills from the RF-2 equipment	~180' x 55'	See Below[2]

[1] Design capacity is calculated based on a tank height as defined by the level at which a high level alarm is initiated.

[2] See Attachment 1 for applicable hazardous waste codes.

[3] Tank system consists of the tank and ancillary piping, pumps, valves, etc.

[4] RF-2 equipment includes interconnecting piping, ducts, pumps, valves, sumps, etc.

3.0 GENERAL FACILITY INFORMATION

The following is general information pertaining to the ~~SWT~~SII facility:

Facility Name:	~~Siemens Water Technologies Corp.~~Siemens Industry, Inc.
Address:	2523 Mutahar Street Parker, Arizona 85344
Facility Contact:	Monte McCue, Director – Plant Operations
Telephone Number:	(928) 669-5758
EPA ID Number:	AZD 982 441 263

4.0 CONTAINER STORAGE AREA, TANKS, ANCILLARY EQUIPMENT AND CARBON REACTIVATION UNIT

This section of the Closure Plan provides a description of the waste streams managed at the facility, the container storage area, the storage tanks and their associated ancillary equipment, and the carbon reactivation unit.

4.1 WASTE PHYSICAL PROPERTIES

The sole hazardous waste stream managed at the facility consists of spent activated carbon. The waste codes associated with this waste stream are identified in Attachment 1. This waste stream is a solid at ambient temperatures. Steam or water is normally used as the solvent for decontamination of equipment used for managing this waste stream.

4.2 EQUIPMENT EVALUATION

~~SWT~~SII has evaluated the management of this waste stream for development of this Closure Plan. This evaluation defined three groups of equipment for consideration: (1) the container storage area; (2) the tanks, containment areas, and ancillary equipment associated with the tanks; and (3) the RF-2 carbon reactivation unit. The evaluation process is discussed in the following sections.

4.2.1 CONTAINER STORAGE AREA SUMMARY

The Container Storage Area consists of a covered, reinforced concrete pad with perimeter curbs. The perimeter curbs on all four sides of the concrete pad are constructed of reinforced concrete. The base is maintained free of cracks or gaps and is liquid tight to contain liquid in the event of spills or leaks. For the purposes of this Closure Plan, the facility assumes the container storage area will be full to its maximum capacity (100,000 gallons, or approximately 1,818 – 55 gallon drums) at the time of closure.

4.2.2 TANKS AND ASSOCIATED ANCILLARY EQUIPMENT EVALUATION SUMMARY

The facility stores spent activated carbon in 5 tanks meeting applicable EPA standards for the storage of hazardous wastes. Tank detail sheets showing tank dimensions, shell thickness, supports, foundations, and other information for the tanks are provided in the Part B Permit Application. The tank capacities are identified in Table 2-1. For the purposes of this Closure Plan, the facility assumes that the tanks will be full to their maximum capacity at the time of closure.

The tanks at the facility are constructed of steel. The tanks are of closed top design and are integrally constructed. The ancillary equipment for each tank includes items such as piping, pumps, valves, and flow meters leading from the loading areas to the tanks, between the tanks, and from the tanks to the carbon reactivation unit. The ancillary equipment is constructed mainly of steel, and flexible hoses may be used in certain areas. Secondary containment for the tanks is provided and is constructed of reinforced concrete with perimeter dikes to prevent migration of spillage, leakage, or contaminated stormwater.

4.2.3 CARBON REACTIVATION UNIT SUMMARY

The facility reactivates the spent carbon in the carbon reactivation furnace (RF-2). The design capacity for the furnace is identified in Table 2-1. The RF-2 carbon reactivation unit is constructed of steel and is approximately 12'-10" in diameter by 19'-8" feet tall. The RF-2 carbon reactivation unit includes five internal hearths and a center shaft with rabble arms to agitate the spent carbon.

Equipment associated with the RF-2 carbon reactivation unit include:

- Afterburner
- Quench and venturi scrubber
- Packed tower scrubber with scrubber packing
- Wet electrostatic precipitator
- Induced draft fan
- Stack.

Containment for the carbon reactivation unit is provided and is constructed of reinforced concrete with perimeter dikes to prevent migration of spillage, leakage, or contaminated stormwater. The containment has regularly been ~~recently~~ inspected by ~~SWT~~SII and is free of cracks and gaps, which will prevent migration of materials through the concrete.

5.0 CLOSURE REQUIREMENTS

~~SWT~~SII has prepared this Closure Plan in compliance with the 40 CFR 264 Subparts G, I, J, and X requirements. Closure shall be performed in such a manner as to:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous wastes, hazardous leachates, contaminated runoff, or hazardous waste decomposition products to the groundwater, surface water, or the atmosphere;
- Comply with the closure requirements of 40 CFR 264 Subpart G, including, but not limited to, the requirements of 40 CFR 264.178 for containers, 40 CFR 264.197 for tanks, and 40 CFR 264 Subpart X for the carbon reactivation unit; and
- Confirm that any structures left in place on site meet the performance standards established for site closure.

The goal of this plan is to achieve clean closure. In short, this means that all hazardous wastes will be removed from the RCRA regulated units, and that any releases at or from the units will be remediated so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment. In the event clean closure cannot be achieved, further investigation and remediation work will be performed.

The closure of each hazardous waste management unit at the facility will be accomplished by:

- Decontaminating all contaminated equipment, containment system components and associated structures to specified closure performance standards;
- Verifying whether equipment has been decontaminated successfully based on the intended disposition;
- Dismantling and removing equipment that has either been decontaminated successfully or will be disposed;
- Decontaminating containment structures and verifying that they have been successfully decontaminated and removing any contaminated concrete;
- Determining whether soil contamination beneath the containment pads has occurred; and
- If soil contamination is found, remediating contaminated areas so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment.

5.1 CLEAN CLOSURE PERFORMANCE STANDARDS

Hazardous waste management units will be considered clean closed if they meet the following closure requirements:

5.1.1 PROCESS EQUIPMENT

Process equipment includes such items as tanks, piping, pumps, valves, the carbon reactivation furnace vessels, interconnecting ductwork, and air pollution control equipment. Process equipment will be considered clean closed if the decontaminated surfaces meet the Clean Debris Surface Standard (40 CFR 268.45, Table 1, Section A.1.e).

In smaller equipment items, where surfaces are not amenable to thorough visual inspection, a sample of the final decontamination rinsate from each item (or batch of small equipment items) will be collected and analyzed for a set of selected contaminants of concern (COCs). Those analytical results will be compared to the analytical results of decontamination water before it is used. If the COC concentration of the final rinsate sample is ~~below~~ equal to or less than the COC concentration of the unused decontamination water (with 95% confidence) the equipment will be confirmed to be decontaminated.

5.1.2 CONCRETE CONTAINMENT PADS AND SUPPORT STRUCTURES

Concrete containment pads and steel structures will be considered clean closed if the decontaminated surfaces meet the Clean Debris Surface Standard (40 CFR 268.45, Table 1, Section A.1.a, b, c, d, or e).

5.1.3 SOILS

Soils will be considered clean ~~closed~~ if detectable metal constituents are at or below the mean of background sample results plus two standard deviations, and detectable organic constituents are below EPA Region 9's Preliminary Remediation Goals (PRGs) for Industrial Soil. If levels exceeding these standards at statistically significant levels are detected in soil, appropriate corrective action will be implemented.

5.2 ALTERNATIVE TO MEETING CLEAN CLOSURE PERFORMANCE STANDARDS

For some or all of the items subject to closure, ~~SWT~~SII may choose to dismantle the item and dispose of it as hazardous waste or as hazardous debris at an appropriate TSDF. Disposal in this manner may be done if decontamination efforts are not sufficient to satisfy the clean closure performance standards described above, or may be done instead of decontamination. In either of these cases, the removal of the contaminated item constitutes clean closure, rather than decontamination and evaluation against the performance standards described above.

6.0 CLOSURE ACTIVITIES

This section describes both the general and specific closure activities for the container storage area, the storage tanks and their associated ancillary equipment, and the carbon reactivation unit.

6.1 GENERAL CLOSURE ACTIVITIES

The following sections of the Closure Plan are written from the perspective that third party contractors will perform the closure activities in conjunction with site personnel. The closure costs identified in Section 11.0 were developed based on the "worst case" scenario of only using contractors. ~~SWT~~SII may perform the closure activities using ~~SWT~~SII personnel (except for the Professional Engineer). In addition, the following sections are written to address the container storage area, the storage tanks and their associated ancillary equipment, and the carbon reactivation unit identified above, assuming that metallic components can be scrapped rather than being disposed. The cost estimates include the cost of dismantling each major piece of equipment identified in Table 2-1, but do not include any credit which may be realized from the sale of scrap materials.

~~SWT~~SII will utilize contractors to ensure that all activities are performed to minimize the need for future maintenance, maximize, to the extent necessary, the protection of human health and the environment, and eliminate post-closure escape of hazardous waste, hazardous constituents, contaminated run-off and/or hazardous waste decomposition products.

~~SWT~~SII will utilize facility health and safety and waste management procedures to address the following items prior to initiating closure:

(1) PPE and respiratory protection criteria;
(2) Air monitoring methods and techniques;
(3) Run-on/off controls for site activities;
(4) Site safety meeting criteria and schedule;
(5) Detailed site organization responsibilities;
(6) Impermeable barrier techniques and materials to be used to protect non-closure affected areas;
(7) Waste handling methods;
(8) Site material storage scenarios to segregate hazardous and nonhazardous materials;
(9) Fire protection mechanisms and techniques;
(10) Site specific Contingency Plan to address potential response activities;
(11) Proof of training and medical monitoring to satisfy OSHA compliance; and
(12) Certification and permits for any subcontractor services (if necessary).

In general, the closure activities will be performed during daylight hours. Also, site activities will be scheduled to allow personnel to secure the closure areas before leaving each day. A 10 hour workday is anticipated.

In the event that specific closure activities do not allow a safe or effective shutdown and activities are required to be performed at night, ~~SWT~~SII will provide the necessary lighting and equipment to complete the work in a safe manner.

Contractors will perform all Confined Space activities pursuant to ~~the SWT~~a Confined Space Entry program. Similar criteria are applicable for the Lock-Out/Tag-Out programs associated with confined space activities. The closure site boundary will be clearly delineated by barricades, signs, and other markers, as necessary, to ensure closure site security. Site security mechanisms will be installed at the end of each working day.

A site-specific Health and Safety Plan (HASP) will be developed by the contractor hired to perform the closure activities.

During the closure activities, utilities (i.e., electricity, water, steam, etc.) will be provided by ~~SWT~~SII. The closure cost estimate includes the costs for providing these utility services.

All debris and other miscellaneous materials will be collected and stored as necessary on a daily basis. No waste, hazardous or otherwise, will be left in the units to be closed at closure completion. Site inspection ~~by SWT personnel~~ will be performed to ensure that all hazardous waste and residuals are removed from the closure area to prevent any post-closure escape of hazardous waste, hazardous constituents, contaminated run-off, or hazardous waste decomposition products that could potentially affect groundwater, surface waters, or the atmosphere.

Site activities will be performed with the necessary barricades to prevent migration of hazardous waste during closure activities. This includes all site storage areas, temporary decontamination stations, etc. Potential prevention methods and equipment include:

- Silt fences;
- Straw boundary barricades; and
- Temporary decontamination stations, etc.

Spill response activities will be specified per the ~~SWT~~SII Contingency Plan. Berm construction will consist of the use of visqueen and/or HDPE liners placed on the containment pad nearest to the equipment, anchored by weights such as sand, oil dry, or other suitable materials. Lay down areas will include only the area within containment, and direct placement into the macroencapsulation debris roll-off boxes, where used. The macroencapsulation debris roll-off boxes will be placed in the vicinity of the equipment being dismantled.

Temporary barriers, liners, etc. will be utilized during closure activities to prevent contamination of soil or groundwater. Inspections will be performed to address potential contributions from closure activities. Evidence of potential contributions will initiate immediate corrective action activities.

~~SWT will employ a~~An independent Registered Professional Engineer ~~to~~ will confirm that all closure activities have been performed in accordance with the approved Closure Plan. This individual will be responsible for making site inspections, on an as needed basis, for confirmation of certification requirements. The engineer will ~~consult, as necessary, with the appropriate SWT personnel to~~ ensure that all activities are being performed pursuant to the Closure Plan and in compliance with 40 CFR 264 Subparts G, I, J, and X.

6.2 SPECIFIC CLOSURE ACTIVITIES

This section identifies the specific closure activities for the container storage area, the storage tanks and their associated ancillary equipment, and the carbon reactivation unit.

Decontamination activities during closure will include the following:

- Tanks, piping, pumps, valves, and other small equipment will be decontaminated and either sold for reuse, recycled, or disposed as nonhazardous waste, or transported offsite to an appropriate TSDF for disposal.
- Contaminated secondary containment structures will be decontaminated, if possible, to achieve the closure performance standards if they are to be left on-site. As an option, contaminated structures, storage tanks, and associated equipment that may not be decontaminated will be demolished and/or cut up, and transported offsite as a hazardous waste to an appropriate TSDF.
- Contaminated soil identified during site closure will be removed and transported offsite to an appropriate TSDF for disposal or otherwise remediated.
- All equipment, including mobile equipment and earth moving equipment that comes in contact with hazardous waste constituents during closure, will be decontaminated using detergent and water (or water alone), before leaving the contaminated area or removal from the facility.
- Any residues generated during decontamination activities will be handled in accordance with all applicable hazardous waste requirements of 40 CFR 261, 262, 263, and 268.34.
- Rinse water and wastewater generated during decontamination activities will be treated in the on-site wastewater treatment unit and discharged to the POTW.

Depending on the type and condition of each surface to be decontaminated, one or more of the following technologies will be utilized for decontamination:

- Physically scraping the surfaces with appropriate hand tools to remove attached materials;
- Rinsing with low-pressure water or a detergent/surfactant cleaning solution to remove scaling and surface debris;
- Hydroblasting and/or pressure washing with high-pressure water to scour the surface to remove contaminants and carry them away from the surface; or
- Steam cleaning to remove contaminants that cannot be adequately removed by other means.

6.2.1 CONTAINER STORAGE AREA

When the container storage area is to be closed, the facility will first remove all containers of hazardous waste from the area. For purposes of the closure cost estimate, it is assumed that the spent activated carbon in the container storage area will be shipped off-site for incineration at an appropriate TSDF. Alternatively, the contents of the containers will be transferred into the tank system, and the empty containers will be sent for reconditioning or disposal. If the alternative is used, the spent carbon will be subsequently treated in carbon reactivation unit RF-2.

Residuals potentially generated during transfer activities may include drips, leaks, and spills. These will be collected in containers, liners, pads, and absorbent materials, as necessary, for any drips, leaks, or spills that occur. Any residuals generated will be cleaned up immediately to maintain site integrity. All residuals will be consolidated for off-site disposal as hazardous waste.

Operators and all other personnel involved in work activities will be equipped with the proper PPE during all closure activities. Personnel will be made aware of the proper PPE as well as the proper operating techniques of all pumps, trucks, etc. necessary to perform the activity prior to implementation. PPE will be collected in designated containers for off-site disposal.

All concrete containment surfaces within the container storage area will be decontaminated to the maximum extent possible. The decontamination procedures will also apply to the sump collection systems within these containment structures. If it is determined that a containment area cannot be successfully decontaminated, then the structures may be demolished, removed, and disposed of off-site at a permitted TSDF.

The containment surfaces will initially be inspected for any cracks, gaps or other major structural defects prior to decontamination to determine potential subsurface soil sampling locations. An initial survey was conducted as part of the development of this Closure Plan, and preliminary soil sampling locations have been selected as shown on the figure included in the Sampling and Analysis Plan. Any cracks that are observed to extend through the entire thickness of the concrete slab will be sealed prior to decontamination of the unit. The containment pads then will be decontaminated by an appropriate decontamination technology. Areas with extensive staining or impacted contamination will be noted and addressed. All scarified materials removed from the concrete surfaces and wash water generated during decontamination will be isolated and contained within the containment pad using appropriate engineering controls, such as sand bags, visqueen plastic sheeting, and temporary absorbent barriers.

Upon verification that the containment area has met the closure performance standards, the area will be marked and isolated, or demolished and removed for disposal off site as a non-hazardous waste.

The following miscellaneous decontamination items will be considered during the container storage area closure activities:

- Disposable tools (i.e., brushes, etc.) will be collected in a designated area for off-site disposal as hazardous waste; and
- Non-disposable tools (i.e., wrenches, etc.) will be decontaminated using detergent and water (or water alone) ~~with an appropriate solvent~~ prior to leaving the closure area.

6.2.2 TANKS AND ASSOCIATED ANCILLARY EQUIPMENT

Once the decision to initiate closure has been made, the lines to each of the five tanks will be locked out. For this reason, the maximum inventory of spent carbon expected to be present in each of the tanks is the amount identified in Table 2-1. For purposes of the closure cost estimate, it is assumed that the spent activated carbon in the tanks will be loaded onto trucks and shipped off-site for incineration at an appropriate TSDF. Alternatively, this material will be removed for treatment in carbon reactivation unit RF-2. The waste will be removed from the tanks and all associated ancillary equipment with existing site pumps, tanker loading equipment, and pressure washing and/or steaming, as necessary. Following the processing of all waste contained in the tanks, the lines associated with each of the tanks will be drained to the greatest extent possible and will be disconnected and blinded.

Decontamination and closure activities associated with the tanks will be limited to those surfaces that the waste stream contacted or potentially contacted. These will include the ancillary equipment previously identified, the internals of the tanks, and the containment area surrounding the tanks.

Residuals potentially generated during decontamination activities may include drips, leaks, and spills from piping and other equipment. These will be collected in containers, liners, pads, and absorbent materials, as necessary, for any drips, leaks, or spills that occur. Any residuals generated will be cleaned up immediately to maintain site integrity. All residuals will be consolidated for off-site disposal as hazardous waste.

Operators and all other personnel involved in work activities will be equipped with the proper PPE during all closure activities. Personnel will be made aware of the proper PPE as well as the proper operating techniques of all pumps, trucks, blenders, etc. necessary to perform the activity prior to implementation. PPE will be collected in designated containers for off-site disposal.

The ancillary equipment associated with the tanks will be removed. Non-metallic items will be collected and placed into roll-off boxes for macroencapsulation and disposal as hazardous debris. The piping and metallic ancillary equipment will be removed, cut into manageable pieces, and closed as follows:

- Pressure washing and/or steam cleaning will be performed, as necessary, to remove any residue;

- Collection vessels for wash waters will be provided for consolidation and subsequent treatment in the in-house wastewater treatment system prior to discharge to the POTW;
- Upon completion of the decontamination activities, the ancillary equipment will be evaluated to ensure that it has met the closure performance standards;
- For small equipment items that are not amenable to thorough visual inspection, a sample of the final rinsate will be collected and analyzed for confirmation that the performance standards have been met;
- The decontaminated ancillary equipment will be disassembled, removed, and sent as scrap metal for recycling;
- Any items not meeting the closure performance standards will either undergo further decontamination or will be disposed of at an appropriate TSDF as hazardous debris.

The following closure activities associated with the decontamination of the tanks will be performed:

- Any remaining liquid and sludge will be removed from the tanks as possible using physical (e.g., pumping, etc.) means;
- The tanks will be purged of vapor and the tank will be opened to allow access to personnel;
- Confined Space Entry procedures will be utilized;
- Lock-Out/Tag-Out procedures will be utilized;
- Contractors will enter the tanks and remove any residual sludge through physical means;
- Pressure washing and/or steam will be used to remove any remaining contamination until the tanks meet the closure performance standards. Decontamination fluids will be collected for treatment in the in-house wastewater treatment system prior to discharge to the POTW.

Upon completion of the decontamination activities, the tanks will be evaluated to ensure the tank internals meet the closure performance standards. The outside of the tanks and surrounding areas will also be inspected (and decontaminated, if necessary). Decontaminated tanks that meet the closure performance standard may be re-used at a TSDF, sold for re-use at a TSDF or other industrial application, left in place, or cut into manageable pieces and sent to a scrap metal reclaimer.~~If the tanks are in suitable condition, they may be sold to another facility. Otherwise, the tanks will be either left in place or cut into manageable pieces and shipped off site as scrap metal.~~ The cost estimate includes the cost for dissembling, cutting and shipping the tanks for scrap. No credit has been taken for any revenue received for scrap sales.

All concrete containment surfaces associated with the tanks will be decontaminated to the maximum extent possible. The decontamination procedures will also apply to the sump collection systems within these containment structures. If it is determined that a containment area cannot be successfully decontaminated, then the structures may be demolished, removed, and disposed of off-site at a permitted TSDF.

The containment surfaces will initially be inspected for any cracks, gaps or other major structural defects prior to decontamination to determine potential subsurface soil sampling locations. An initial survey was conducted as part of the development of this Closure Plan, and preliminary soil sampling locations have been selected as shown on the figure included in the Sampling and Analysis Plan. Any cracks that are observed to extend through the entire thickness of the concrete slab will be sealed prior to decontamination of the unit. The containment pads then will be decontaminated by an appropriate decontamination technology. Areas with extensive staining or impacted contamination will be noted and addressed. All scarified materials removed from the concrete surfaces and wash water generated during decontamination will be isolated and contained within the containment pad using appropriate engineering controls, such as sand bags, visqueen plastic sheeting, and temporary absorbent barriers.

Upon verification that the containment area has met the closure performance standards, the area will be marked and isolated, or demolished and removed for disposal off site as a non-hazardous waste.

The following miscellaneous decontamination items will be considered during the tank closure activities:

- Disposable tools (i.e., brushes, etc.) will be collected in a designated area for off-site disposal as hazardous waste; and
- Non-disposable tools (i.e., wrenches, etc.) will be decontaminated with ~~an appropriate solvent~~ detergent and water (or waste alone), prior to leaving the closure area.

6.2.3 CARBON REACTIVATION UNIT RF-2

Once the decision to initiate closure has been made, the lines to the carbon reactivation unit will be locked out, and will only be utilized to treat the material remaining in the containers and tanks, as identified above. The spent carbon stored in bulk and in containers will be treated by reactivation in carbon reactivation unit RF-2 and subsequently packaged for reshipment to customers. A maximum of 100,000 gallons of spent activated carbon from containers and approximately 45,000 gallons of spent activated carbon in bulk will be on site at the time of closure.

Slurry recycle water is consumed in the carbon reactivation process and it is anticipated that most of it will be consumed during the treatment of the spent activated carbon inventory during closure. The slurry water that is not consumed will be treated in the in-house wastewater treatment system prior to being discharged to the POTW. Additionally, makeup water may be required to complete the reactivation of all the spent carbon inventory. It is anticipated that a portion of the makeup water will be supplied by decontamination wash water produced during closure. Scrubber blowdown will be discharged to the local POTW consistent with the facility's discharge permit.

Upon completion of this treatment, carbon reactivation unit RF-2 will be operated at or above the minimum permitted temperatures, using auxiliary fuels only, and without processing any additional spent carbon, for a period of four hours to ensure that the unit is organically decontaminated. After this period, the unit will be shut down, cooled, locked out, and all lines to the unit will be removed as identified above. Therefore, the material remaining in the carbon reactivation unit and associated downstream equipment will be residual in nature, and only inorganic contaminants (metals) may remain. (See EPA memo regarding closure of hazardous waste incinerators in Attachment 2). The material remaining in the carbon reactivation unit will be removed with existing site pumps, tanker loading equipment, manual techniques, and pressure washing and/or steaming, as necessary.

Decontamination and closure activities associated with the carbon reactivation unit will be limited to those surfaces that the waste stream or treatment residuals contacted or potentially contacted. These will include the internals of the carbon reactivation unit and downstream equipment, and the containment pad for the carbon reactivation unit.

Residuals potentially generated during decontamination activities may include drips, leaks, and spills. These will be collected in containers, liners, pads, and absorbent materials, as necessary, for any drips, leaks, or spills that occur. Any residuals generated will be cleaned up immediately to maintain site integrity. All residuals will be consolidated for off-site disposal as hazardous waste.

Operators and all other personnel involved in work activities will be equipped with the proper PPE during all closure activities. Personnel will be made aware of the proper PPE as well as the proper operating techniques of all pumps, trucks, blenders, etc. necessary to perform the activity prior to implementation. PPE will be collected in designated containers for off-site disposal.

The following closure activities associated with the decontamination of the carbon reactivation unit will be performed:

- Any remaining liquid and sludge will be removed from the carbon reactivation unit off gas treatment equipment using physical (e.g., pumping, etc.) means. Liquids will be treated in the in-house wastewater treatment system prior to being discharged to the POTW. Sludges will be placed into a roll-off box for macroencapsulation and disposal as hazardous debris;
- The carbon reactivation unit and downstream equipment will be purged of vapor and the carbon reactivation unit will be opened to allow access to personnel;
- Confined Space Entry procedures will be utilized;
- Lock-Out/Tag-Out procedures will be utilized;
- Contractors will enter the carbon reactivation unit and downstream equipment and remove any residual material (sludge, carbon, or slag) through physical means using hand tools;
- Scrubber packing will be physically removed and placed in a roll-off box for macroencapsulation for disposal as hazardous debris;
- Residual sludge, activated carbon, and slag should be minimal based on experience with periodic maintenance of the unit, and will be placed into roll-off

boxes for macroencapsulation, or a 55-galllon drum of incinerables for off-site disposal;

- The refractory in the RF-2 furnace, afterburner, and connecting ductwork will be removed using hand tools and placed into a roll-off box for disposal as hazardous debris using macroencapsulation;
- Pressure washing and/or steam will be used to remove any remaining contamination until the carbon reactivation unit and downstream equipment meets the closure performance standards. Decontamination fluids will be collected and treated through the in-house wastewater treatment system prior to discharge to the POTW;
- For small equipment items that are not amenable to thorough visual inspection, a sample of the final rinsate will be collected and analyzed for confirmation that the performance standards have been met.

Upon completion of the decontamination activities, the carbon reactivation unit and downstream equipment will be inspected to ensure the internals meet the closure performance standards. The outside of each equipment item and surrounding areas will also be inspected (and decontaminated, if necessary).

Once the carbon reactivation unit and downstream equipment have been determined to be cleaned, equipment will be dismantled. Metallic items will be scrapped. Fiberglass, plastic, and other non-metalic components will be disposed of as non-hazardous debris. Packed scrubber internals will be macroencapsulated and disposed of as hazardous debris.

All concrete containment surfaces associated with the carbon reactivation unit and downstream equipment will be decontaminated to the maximum extent possible. The decontamination procedures will also apply to the sump collection systems within these containment structures. If it is determined that a containment area cannot be successfully decontaminated, then the structures may be demolished, removed, and disposed of off-site at a permitted TSDF.

The containment surfaces will initially be inspected for any cracks, gaps or other major structural defects prior to decontamination to determine potential subsurface soil sampling locations. An initial survey was conducted as part of the development of this Closure Plan, and preliminary soil sampling locations have been selected as shown on the figure included in the Sampling and Analysis Plan. Any cracks that are observed to extend through the entire thickness of the concrete slab will be sealed prior to decontamination of the unit. The containment pads then will be decontaminated by an appropriate decontamination technology. Areas with extensive staining or impacted contamination will be noted and addressed. All scarified materials removed from the concrete surfaces and wash water generated during decontamination will be isolated and contained within the containment pad using appropriate engineering controls, such as sand bags, visqueen plastic sheeting, and temporary absorbent barriers.

Upon verification that the containment area has met the closure performance standards, the area will be marked and isolated, or demolished and removed for disposal off site as a non-hazardous waste.

The following miscellaneous decontamination items will be considered during the carbon reactivation unit closure activities:

- Disposable tools (i.e., brushes, etc.) will be collected in a designated area for off-site disposal as hazardous waste; and
- Non-disposable tools (i.e., wrenches, etc.) will be decontaminated with ~~an appropriate solvent~~ detergent and water (or water alone), prior to leaving the closure area.

6.2.4 SOIL INVESTIGATION

Following decontamination and partial dismantlement of the containment structures, storage tanks, and equipment at the site, soils beneath the HWMUs will be investigated. By drilling borings through the secondary containment pads, the soils will be sampled and analyzed to confirm that no residual contamination is present. The purpose of soil sampling and analysis is to identify areas where remediation may be necessary as a result of past practices and to meet the soil closure performance standards.

All collection and analysis of soil samples will be in accordance with the SAP, which includes provisions for using standard test methods, a state-certified laboratory for analyses, proper chain-of-custody procedures, and quality control/quality assurance samples such as field blanks, trip blanks, and duplicate samples.

Soils beneath each of the HWMUs will be sampled at a minimum of two to five points. Additional sample locations within each structure will be based on locations of cracks or stains in the secondary containment systems.

Background samples will also be collected from three separate locations according to the SAP. The locations ~~will be~~are shown in the SAP, and have been selected outside of the facility's operational areas during a site survey conducted during 2011 in cooperation with the EPA Project Manager (Mr. Mike Zabaneh) and will represent constituent concentrations that have not been impacted by site operations. The results of these soil samples will be used in the development of metals closure performance standards for the site.

Soil samples will be collected at a series of depths starting just below the concrete slab. Shallow samples will be collected using a Geoprobe direct push method or hand-auger, while deeper borings will be drilled with a larger sonic or hollow stem auger rig.

After the samples are collected, each boring will be backfilled with grout. The collected soil samples will be transferred to the laboratory for analysis by the methods specified in the SAP.

If the analytical results of these soil samples meet the cleanup criteria specified in this Closure Plan, then the soils will be considered clean closed. If the samples do not meet the cleanup performance criteria, then additional soil sampling will be conducted in the area near where the contamination was found, in order to determine the extent of contamination, and appropriate remedial action will be taken. For purposes of the closure cost estimate, it has been assumed that soil borings to groundwater will be conducted at three locations, with additional sampling and analysis at 5 depths in each boring.

7.0 SAMPLING AND ANALYSIS

~~SWT~~SII has utilized the EPA Guidance Document "Draft of Guidance of Incinerator Closure" (June 29, 1990) in the preparation of this Closure Plan. A copy of this guidance is included in Attachment 2. It is suggested by USEPA to utilize the techniques discussed in this document to clean close all combustion related facilities. In this document, EPA recommends (in the section entitled "Approach to Incinerator Closure") operating the thermal equipment at or above minimum permit temperatures for a period of four hours to remove organic contaminants form the system. The guidance also suggests using a water rinse to remove residual inorganic contaminants to decontaminate equipment.

As described in detail in Section 6.0, ~~SWT~~decontaminated surfaces will be visually examined ~~surfaces~~ to determine if the Clean Debris Surface Standard of 40 CFR 268.45 Table 1, Section A is met. For equipment and other items that are not amenable to a thorough visual inspection, ~~SWT will obtain~~ samples of the final rinse for each piece or batch of equipment/items will be obtained for comparison to the decontamination standards. Soil samples will be collected from background (non-process) locations and from several borings under the concrete containment pads. A summary list of the samples to be obtained is provided as Table 7-1. The samples will be obtained in accordance with a site specific "Sampling and Analysis Plan" (SAP) contained in a separate appendix to the RCRA Part B Permit Application. In addition, the samples will be handled and analyzed in accordance with site specific "Quality Assurance Objectives" which are addressed in the SAP. The SAP identifies items such as the appropriate sample containers, sampling techniques, sample preservation, chain-of-custody procedures, specific analytical procedures, and detailed QA/QC procedures, etc. General information for sample analysis and QA/QC is provided with this closure plan.

Each of the samples identified in Table 7-1 associated with the decontamination of equipment/items will be analyzed for a set of selected Compounds of Concern (COCs) that will be used to assess the decontamination of equipment/items. Based on a review of the waste codes received at the site (Attachment 1) and the constituents associated with those codes, ~~SWT~~SII has selected COCs for closure purposes. Those selections include ~~the metals antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, selenium, silver, thallium, and vanadium~~metals, halogenated volatile organics, aromatic and unsaturated volatile organics, nonhalogenated volatile organics,halogenated and nonhalogenated semivolatile organics, polyaromatic compounds, phenolic compounds, nitriles, nitrogen and phosphorous containing pesticides, and organochlorine and other organohalide pesticides. The closure COCs are listed in Attachment 3.
~~In addition, one indicator constituent has been identified from the following families of constituents present in the hazardous waste managed at the facility to demonstrate that the organics have been sufficiently removed (also see the SAP):~~

- ~~Halogenated volatile organics (1,1,1-trichloroethane by SW-846 Method 8260B);~~
- ~~Aromatic and unsaturated volatile organics (toluene by SW-846 Method 8260B);~~
- ~~Nonhalogenated volatile organics (benzene by SW-846 Method 8260B);~~
- ~~Phenolic compounds (phenol by SW-846 Method 8270C);~~
- ~~Nitrogen and phosphorous containing pesticides (malathion by SW-846 Method~~

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~~8141A);~~

- ~~Organochlorine and other organohalide pesticides (4,4’-DDT by SW-846 Method 8270C); and~~
- ~~Nitriles (acrylonitrile by SW-846 Method 8260B).~~

For the assessment of soil contamination, each soil sample identified in Table 7-1 will be analyzed for the same group of metals identified above, and will also receive a full scan volatile and semivolatile organic analysis for comparison to PRGs.

TABLE 7-1. SAMPLES FOR CLOSURE CERTIFICATION

ITEM	ESTIMATED NUMBER OF SAMPLES TO BE OBTAINED	ANALYSES
Container Storage Area		
Equipment rinsate	1 (small equipment batch)	Metals[1], Organics[2]
Soil (initial sampling)	9 (assume 3 locations, 3 depths each)	Metals[1], Organics[3]
Tanks and Ancillary Equipment		
Equipment rinsate	5 (1 small equipment batch for each tank system)	Metals[1], Organics[2]
Soil (initial sampling)	21 (assume 7 locations, 3 depths each)	Metals[1], Organics[3]
Carbon Reactivation Unit		
Equipment rinsate	3 (1 small equipment batch for each RF-2 furnace/afterburner, APCD, Fan/stack)	Metals[1]
Soil (RF-1 and RF-2 areas, initial sampling)	9 (assume 3 locations, 3 depths each)	Metals[1], Organics[3]
Un-used decontamination water	3	Metals[1], Organics[2]
Background Soil	9 (3 locations, 3 depths, each)	Metals[1]
Soil (borings to groundwater if initial sampling shows contamination)	15 (3 locations, 5 depths each)	Metals[1], Organics[3]

Sample analyses:
[1] Metals ~~(Sb, As, Ba, Be, Cd, Cr, Pb, Se, Ag, Tl, V) by SW-846 Method 6010. Mercury by SW-846 Method 7470~~by SW-846 Method 6010 and 7470 for the target metal analytes listed in Attachment 3.
[2] Organics by SW-846 Methods 8260, 8270, and 8141 for the compounds listed in Attachment 3.~~:~~

~~Halogenated volatile organics (1,1,1-trichloroethane by SW-846 Method 8260B);~~

~~Aromatic and unsaturated volatile organics (toluene by SW-846 Method 8260B);~~

~~Nonhalogenated volatile organics (benzene by SW-846 Method 8260B);~~

~~Phenolic compounds (phenol by SW-846 Method 8270C);~~

~~Nitrogen and phosphorous containing pesticides (malathion by SW-846 Method 8141A);~~

~~Organochlorine and other organohalide pesticides (4,4'-DDT by SW-846 Method 8270C); and~~

~~Nitriles (acrylonitrile by SW-846 Method 8260B).~~

3. Organics: Full scan volatiles (SW-846 Method 8260~~B~~) and full scan semivolatiles (SW-846 Method 8270~~C~~) for comparison to PRGs for soil.

In all cases, the latest version of the analytical methods will be used.

The background concentration for the metal constituents will be the metals closure performance standard for closure certification of soils. The EPA Region 9 Preliminary Remediation Guide (PRG) concentrations for the organic constituents in Industrial Soils will serve as the organic closure performance standards for closure certification of soils.

For equipment or other items that cannot be adequately inspected or may not meet the Clean Debris Surface Standard of 40 CFR 268.45 Table 1, Section A, ~~SWT will collect~~ a sample of the final rinsate from the decontamination process associated with each piece of equipment/item will be collected, and ~~compare~~ the analytical results for the metal and organic COCs will be compared to the analysis of unused decontamination water.

Equipment/items meeting the clean closure performance standards defined in Section 5.0 of this document will be deemed to be clean and can be removed from RCRA Subtitle C regulation. For equipment/items not meeting the clean closure performance standards, the facility will perform additional decontamination (i.e., repeat the decontamination as specified for that piece of equipment/item) and re-evaluate the decontaminated equipment/item against the clean closure performance standards.

If, after a number of attempts are made to decontaminate equipment/items and the clean closure performance standards are not met, the facility will dispose of the equipment/item off-site as hazardous waste.

Rather than decontaminating equipment/items, the facility may alternatively elect to ship the piece of equipment/item offsite for treatment/disposal as a hazardous waste. This would remove the equipment/item from the site. Therefore no threat to human health or the environment would be applicable for that piece of equipment at the facility. This decision would be based on the size and geometry of the equipment/item, the cost of treatment and/or disposal, the cost of further decontamination, etc.

8.0 CLOSURE SCHEDULE

The closure activities, as necessary, are scheduled to be performed in general accordance with the following schedule:

Task	Days
Notification of Closure to Regulatory Agency	0 (initiating period)
A. Preparation of Closure Bid Package	7 days (calendar)
B. Submission and Contractor Review	7 days
C. Site Visit for Contractors	7 days
D. Contractor Bid Package Preparation/Submittal	14 days
E. Contractor Award/Contract/Notice to Proceed	7 days
F. Preparation and Submittal of Health & Safety Plan	30 days
G. Contractor Mobilization	14 days
H. Closure Activity Implementation	70 days
i. Container Storage Area Decontamination (20 days)	
ii. Tanks and Ancillary Equipment Decontamination (20 days)	
iii. Carbon Reactivation Unit Decontamination (20 days)	
iv. Soil Investigation (10 days)	
I. Obtain Sample Results	30 days
J. Profiling/Shipment of Materials to be Disposed Off-site as Hazardous Waste/Debris	30 days
K. Submittal of Certification of Closure	60 days
L. Force Majeure	14 days
M. Schedule Contingency	20 days
TOTAL	310 days (calendar)
TOTAL ALLOWED TIME	310 days

This schedule will be utilized for the closure of the container storage area, tanks and associated ancillary equipment, and the carbon reactivation unit. Certain activities (e.g., decontamination of the container storage area, tanks and associated ancillary equipment, and carbon reactivation unit) may be conducted concurrently. The facility will notify EPA of the intent to initiate closure as specified in Section 9.0.

9.0 CLOSURE ACTIVITY NOTIFICATION

~~SWT~~SII will notify the EPA in writing at least ~~45~~ 60 days prior to the date that ~~SWT~~SII expects to initiate closure. ~~SWT~~SII will complete all closure activities within 310 days of initiating closure in accordance with the approved Closure Plan. An extension may be requested if ~~SWT~~SII determines that additional time will be necessary to complete closure.

10.0 CERTIFICATION OF CLOSURE

In accordance with the requirements of 40 CFR 264.115, within sixty (60) days of completing closure, ~~SWT~~SII will notify the EPA, by registered mail, that closure activities have been completed in compliance with the specifications of the approved Closure Plan by submission of a Certification of Closure.

The Certification of Closure will include signatures from the ~~SWT~~SII Owner/Operator and the independent Registered Professional Engineer. ~~SWT~~SII will retain documentation necessary to support the independent Registered Professional Engineer's certification. Support documentation will be submitted to the EPA on request.

Financial assurance documentation will be retained by ~~SWT~~SII until the EPA has officially released ~~SWT~~SII from the financial assurance requirements for Final Closure as required by 40 CFR 264.143(i) and ~~SWT~~SII confirms receipt of this release. In addition, upon receipt of this release, ~~SWT~~SII will consider the container storage area, tanks and ancillary equipment, and carbon reactivation unit closed and all permit requirements identified in the RCRA permit will cease to apply to the container storage area, tanks and associated ancillary equipment, and carbon reactivation unit.

If the facility performs partial closure of any portion of the facility, this Closure Plan will be modified to include only the remaining equipment. In addition, the closure cost estimate will be amended to include only the remaining equipment.

11.0 CLOSURE COST ESTIMATE

The cost estimate for performing the above closure activities pertaining to the container storage area, tanks and associated ancillary equipment and carbon reactivation unit is included as ~~Table 11-1~~Attachment 4 of this Closure Plan.

~~**TABLE 11-1. CLOSURE COST ESTIMATE**~~

~~**ITEM**~~	~~**ASSOCIATED COST**~~
~~**REMOVAL OF REACTIVATED CARBON STORED AT SITE**~~	
~~Loading bags of reactivated carbon on trucks for transport to another Siemens facility for sale or re-use (3,000 bags) 40 bags/hour x $30/hour x 2 people)~~	~~$4,500~~
~~Shipping of bags (3,000 bags)40 bags/truckload x $1,500/truckload)~~	~~$112,500~~
~~**SUBTOTAL REMOVAL OF REACTIVATED CARBON**~~	~~**$117,000**~~
~~**CONTAINER STORAGE AREA CLOSURE COSTS**~~	
~~Transfer spent carbon to trucks for off-site shipment for incineration (1,818 containers) 80 containers/hour x $30/hour x 2 people)~~	~~$1,364~~
~~Shipping containers of spent carbon for off-site incineration (1,818 containers ÷ 176 containers/truckload x $4,000/truckload) (Rounded up to 11 truckloads)~~	~~$44,000~~
~~Off-site incineration of spent carbon ($0.55/lb x 360,000 lb)~~	~~$198,000~~
~~Decontamination of Container Storage Area 24 man hours x $30/hour~~	~~$720~~
~~Rental of Decontamination Equipment 3 days x $100/day~~	~~$300~~
~~Disposal of rinsate at POTW (5,600 sq. ft. x 2 gal/sq. ft. x $0.0025/gal x 3 rinses)~~	~~$84~~
~~One sample of rinsate (plus MS/MSD for QC) will be required at $710 each (3 samples, metals & organic COCs)~~	~~$2,130~~
~~Supervision and management 200 hours x $50/hour~~	~~$10,000~~
~~**SUBTOTAL CONTAINER AREA**~~	~~**$256,598**~~
~~**TANK CLOSURE COSTS**~~	
~~Transfer of spent carbon from tanks to trucks for off-site incineration (8 hours/tank x 5 tanks x $30/hour x 2 people)~~	~~$2,400~~
~~Shipping of bulk spent carbon for off-site incineration (300,000 lb carbon ÷ 40,000 lb/truck x $4,000/truckload (Rounded up to 4 truckloads)~~	~~$32,000~~
~~Off-site incineration of spent carbon ($0.55/lb x 300,000 lb)~~	~~$165,000~~
~~Removal of ancillary equipment 120 hours x $30/hour x 2~~	~~$7,200~~
~~Decontamination of ancillary equipment 120 hours x $30/hour x 2~~	~~$7,200~~
~~Rental of Decontamination Equipment 15 days x $100/day~~	~~$1,500~~

~~ITEM~~	~~ASSOCIATED COST~~
~~Disposal of rinsate from ancillary equipment at POTW~~	~~$1,000~~
~~One sample of rinsate (plus MS/MSD for QC) will be required for small equipment from each tank system at $710/sample (5 tank systems x 3 samples) (metals & organic COCs)~~	~~$10,650~~
~~Supervision and management 100 hours x $50/hour~~	~~$5,000~~
~~Shipment of ancillary equipment offsite as scrap metal (3 loads x $575/load)~~	~~$1,725~~
~~Tank decontamination 5 tanks x 4 hours/tank x $30/hour x 3~~	~~$1,800~~
~~Rental of decontamination equipment 5 days x $100/day~~	~~$500~~
~~Decontamination of tank containment 24 man hours x $30/hour~~	~~$720~~
~~Disposal of rinsate at POTW~~	~~$1,000~~
~~Disassembly of tanks (80 manhours/tank x $50/hr x 5 tanks)~~	~~$20,000~~
~~Shipment of tanks offsite for scrap metal (5 loads x $575/load)~~	~~$2,875~~
~~Supervision and management 40 hours x $50/hour~~	~~$2,000~~
~~SUBTOTAL TANKS~~	~~$262,570~~
~~CARBON REACTIVATION UNIT CLOSURE COSTS~~	
~~Operation of RF-2 (empty) at permit temperatures for organic decontamination (4 hours x $500/hr)~~	~~$2,000~~
~~RF-2 furnace refractory removal (150 manhours x $50/hr)~~	~~$7,500~~
~~RF-2 afterburner refractory removal (150 manhours x $50/hr)~~	~~$7,500~~
~~Disposal of refractory ($500/yd x 20 yd/macro box x 4 boxes)~~	~~$40,000~~
~~Carbon reactivation unit decontamination (RF-2, afterburner, Quench/Venturi, Packed Bed scrubber, WESP, ID Fan, Stack) (6 equipment items x 16 hours/items x $50/hour x 3)~~	~~$14,400~~
~~Rental of decontamination equipment 12 days x $100/day~~	~~$1,200~~
~~Disposal of rinsate at POTW~~	~~$1,000~~
~~One sample of rinsate (plus MS/MSD for QC) will be required for each of 3 small equipment batches at $245/sample (3 batches x 3 samples, metals only)~~	~~$2,205~~
~~Decontamination of carbon reactivation unit containment 24 man hours x $30/hour~~	~~$720~~

~~ITEM~~	~~ASSOCIATED COST~~
~~Disposal of rinsate at POTW~~	~~$1,000~~
~~Disassembly of carbon reactivation unit (RF-2, afterburner, Quench/Venturi, Packed Bed scrubber, WESP, ID Fan, Stack)~~ ~~(480 manhours x $50/hr)~~	~~$24,000~~
~~Rental of 70 Ton Crane (Crane @ $200/hr and Rigger @$55/hr)~~ ~~480 hours @ $255/hour (includes 1 hour mobilization/1 hour demobilization)~~	~~$122,400~~
~~Removal of Unit for Scrap Metal Recycling~~ ~~80 hours/unit x $30/hour x 3 Persons~~	~~$7,200~~
~~Shipment of disassembled carbon reactivation unit offsite for scrap metal~~ ~~(6 loads x $575/load)~~	~~$3,450~~
~~Supervision and management~~ ~~120 hours x $50/hour~~	~~$6,000~~
~~Transportation and disposal of PPE, Sampling Equipment, etc.~~ ~~10 drums at $1,000/drum~~	~~$10,000~~
~~SUBTOTAL CARBON REACTIVATION UNIT RF-2~~	**~~$250,575~~**
~~SOIL INVESTIGATION~~	
~~Concrete/soil boring (including mobilization, permits, labor, boring, Geoprobe, auger, geologist)~~ ~~(16 borings x $350/boring)~~	~~$5,600~~
~~48 samples (16 locations at 3 depths each) plus MS/MSD for QC at $710/sample (50 samples, metals & full-scan volatile and semivolatile organics)~~	~~$35,500~~
~~SUBTOTAL SOIL INVESTIGATION~~	**~~$41,100~~**
~~BACKGROUND/BASELINE SAMPLE ANALYSIS~~	
~~3 samples of un-used decontamination water (plus MS/MSD for QC) at $710/sample (5 samples, metals & organic COCs)~~	~~$3,550~~
~~3 samples of soil borings (at 3 depths each) from areas outside operational boundary (plus MS/MSD for QC) at $245/sample (11 samples, metals only)~~	~~$2,695~~
~~SUBTOTAL BACKGROUND/BASELINE SAMPLES~~	**~~$6,245~~**
~~FOLLOW-UP SOIL BORINGS AND SAMPLE ANALYSIS (ONLY IF CONTAMINATION FOUND)~~	
~~Concrete/soil boring (including mobilization, permits, labor, boring, auger, sampler, geologist)~~ ~~(3 borings to groundwater x $5,000/boring)~~	~~$15,000~~
~~15 samples of soil borings (3 locations at 5 depths each) plus MS/MSD for QC at $710/sample (17 samples, metals & full-scan volatile and semivolatile organics)~~	~~$12,070~~
~~SUBTOTAL FOLLOW-UP SOIL BORINGS~~	**~~$27,070~~**

~~ITEM~~	~~ASSOCIATED COST~~
~~DEBRIS TREATMENT (MACROENCAPSULATION) CLOSURE COSTS~~	
~~Macroencapsulation Box Disposal~~ ~~$500/yard x 20 yards/box x 10 Boxes~~	~~$100,000~~
~~Transportation~~ ~~700 Miles x $2.75/mile x 10 Boxes~~	~~$19,250~~
~~SUBTOTAL DEBRIS TREATMENT~~	~~$119,250~~
~~REMOVAL OF EQUIPMENT LEFT ON-SITE AFTER RF-1 PARTIAL CLOSURE~~	
~~RF-1 furnace removal~~	~~$8,520~~
~~RF-1 Afterburner (AB-1) removal~~	~~$7,020~~
~~Tank T-8 removal~~	~~$7,020~~
~~SUBTOTAL RF-1 EQUIPMENT REMOVAL~~	~~$22,560~~
~~5 Sampling events x 8hr/event x $30/hr~~	
~~PROFESSIONAL ENGINEER CERTIFICATION AND REPORT~~	
~~Professional Engineer certification and report~~	~~$15,000~~
~~SUBTOTAL PROFESSIONAL ENGINEER~~	~~$15,000~~
~~Subtotal Closure Costs (Container Storage Area, Tanks, and Carbon Reactivation Unit)~~	~~$1,117,968~~
~~Project Management, Engineering, Planning (10%)~~	~~$111,797~~
~~Estimated Total Closure Costs (No Contingency)~~	~~$1,229,765~~
~~Contingency (10%)~~	~~$122,976~~
~~TOTAL CLOSURE COST ESTIMATE~~	~~$1,352,732~~

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Note: Analytical costs have been estimated on the following basis:
Metals (excluding Hg) $200/analysis
Mercury $45/analysis
Volatile organics $195/analysis
Semivolatile organics $370/analysis
~~Malathion~~ Nitrogen and phosphorous pesticides $200/analysis

12.0 FINANCIAL ASSURANCE

The financial assurance mechanism currently in effect for closing the entire facility is included as Appendix XVIII to the RCRA Part B Permit Application.

ATTACHMENT 1

WASTE CODES

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
D001	A SOLID WASTE THAT EXHIBITS THE CHARACTERISTIC OF IGNITABILITY
D004	ARSENIC
D005	BARIUM
D006	CADMIUM
D007	CHROMIUM
D008	LEAD
D009	MERCURY
D010	SELENIUM
D011	SILVER
D012	ENDRIN
D013	LINDANE
D014	METHOXYCHLOR
D015	TOXAPHENE
D016	2,4-D
D017	2,4,5-(SILVEX)
D018	BENZENE
D019	CARBON TETRACHLORIDE
D020	CHLORDANE
D021	CHLOROBENZENE
D022	CHLOROFORM
D023	O-CRESOL
D024	M-CRESOL
D025	P-CRESOL
D026	CRESOL
D027	1,4-DICHLOROBENZENE
D028	1,2-DICHLOROETHANE
D029	1,1-DICHLOROETHYLENE
D030	2,4-DITROTOLUENE
D031	HEPTACHLOR (AND ITS EPOXIDE)
D032	HEXACHLOROBENZENE
D033	HEXACHLOROBUTADIENE
D034	HEXACHLOROETHANE
D035	METHYL ETHYL KETONE
D036	NITROBENZENE
D037	PENTRACHLOROPHENOL

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
D038	PYRIDINE
D039	TETRACHLOROETHYLENE
D040	TRICHLOROETHYLENE
D041	2,4,5-TRICHLOROPHENOL
D042	2,4,6-TRICHLOROPHENOL
D043	VINYL CHLORIDE
F001	SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1 TRICHLOROETHANE, CARBON TETRACHLORIDE, CHLORINATED FLUOROCARBONS; AND MIXTURES/BLENDS CONTAINING A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) BEFORE USE OF ONE OR MORE OF THE ABOVE SOLVENTS OR SOLVENTS LISTED IN F002, F004 AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF SPENT SOLVENTS AND MIXTURES
F002	TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLOROETHANE; AND MIXTURES/BLENDS CONTAINING A TOTAL OF 10% OR MORE (BY VOLUME) BEFORE USE OF ONE OR MORE OF THE ABOVE SOLVENTS OR SOLVENTS LISTED IN F002, F004 AND F005 AND STILL BOTTOMS FROM RECOVERY OF SPENT SOLVENTS AND MIXTURES
F003	XYLENE, ACETONE ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANANE, METHANOL; MIXTURES/BLENDS OF ABOVE; AND 10% OR MORE (BY VOLUME) OF F001, F002, F004, F005; AND STILL BOTTOMS FROM RECOVERY OF SPENT SOLVENTS
F004	CRESOLS AND CRESYLIC ACID, NOTROBENZENE; SOLVENT MIXTURES/BLENDS OF 10% OR MORE BEFORE USE OF ONE OR MORE OF ABOVE OR F001, F002, F005; STILL BOTTOMS FROM RECOVERY OF SPENT SOLVENTS
F005	TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, 2-NITROPROPANE; MIXTURES/BLENDS OF 10% OR MORE (BY VOLUME) OF ABOVE OR SOLVENTS LISTED IN F001, F002, F004 AND STILL BOTTOMS FROM RECOVERY OF SOLVENTS
F006	WASTEWATER TREATMENT SLUDGES FROM ELECTROPLATING OPERATIONS EXCEPT FROM SULFURIC ACID ANODIZING OF ALUMINUM; TIN PLATING ON CARBON STEEL; ZINC PLATING ON CARBON STEEL; ALUMINUM, ZINC ALUMINUM PLATING ON CARBON STEEL; CLEANING/STRIPPING ASSOCIATED WITH TIN, ZINC AND ALUMINUM PLATING ON CARBON STEEL; AND CHEMICAL ETCHING AND MILLING OF ALUMINUM
F012	QUENCHING WASTEWATER TREATMENT SLUDGES FROM METAL HEAT TREATING OPERATIONS WHERE CYANIDES ARE USED
F019	WASTEWATER TREATMENT SLUDGES FROM CHEMICAL CONVERSION COATING OF ALUMINUM EXCEPT ZIRCONIUM PHOSPHATING IN ALUMINUM CAN WASHING

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
F025	CONDENSED LIGHT ENDS, SPENT FILTERS AND AIDS, SPENT DESICCANT WASTES FROM PRODUCTION OF CERTAIN CHLORINATED ALIPHATIC HYDROCARBONS (HAVING CARBON CHAIN LENGTHS RANGING FROM 1-5 WITH VARYING AMOUNTS AND POSITIONS OF CHLORINE SUBSTITUTION) BY FREE RADICAL CATALYZED PROCESSES.
F035	WASTEWATERS, PROCESS RESIDUALS, PRESERVATIVE DRIPPAGE, AND SPENT FORMULATIONS FORM WOOD PRESERVING PROCESS GENERATED AT PLANTS THAT USE INORGANIC PRESERVATIVES CONTAINING ARSENIC OR CHROMIUM. DOES NOT INCLUDE K001 BOTTOM SEDIMENT SLUDGE FROM TREATMENT OF WASTEWATER FROM WOOD PRESERVING PROCESSES USING CREOSOTE AND/OR PENTACHLOROPHENOL
F037	PETROLEUM REFINERY PRIMARY OIL/WATER/SOLIDS SEPARATION SLUDGE. SLUDGE FROM GRAVITATIONAL SEPARATION OF OIL/WATER/SOLIDS DURING STORAGE OR TREATMENT OF PROCESS WASTEWATERS AND OILY COOLING WASTEWATERS FROM PETROLEUM REFINERIES. (OIL/WATER/SOLIDS SEPARATORS; TANKS AND IMPOUNDMENTS; DITCHES/CONVEYANCES; SUMPS; STORMWATER UNITS. SLUDGES FROM NON-CONTACT ONCE-THROUGH COOLING WATERS, SLUDG3ES FROM AGRESSIVE BIOLOGICAL TREATMENT UNITS, K051 WASTES
F038	PETROLEUM REFINERY SECONDARY (EMULSIFIED) OIL/WATER/SOLIDS SEPARATION SLUDGE-ANY SLUDGE AND/OR FLOAT GENERATED FROM THE PHYSICAL AND/OR CHEMICAL SEPARATION OF OIL/WATER/SOLIDS IN PROCESS WASTEWATERS AND OILY COOLING WASTEWATERS FROM PETROLEUM REFINERIES. SUCH WASTES INCLUDE, BUT ARE NOT LLIMITED TO, ALL SLUDGES AND FLOATS GENERATED IN: INDUCED AIR FLOTATION (IAF) UNITS, TANKS AND IMPOUNDMENTS, AND ALL SLUDGES GENERATED IN DAF UNITS. SLUDGES GENERATED IN STORMWATER UNITS THAT DO NBOT RECEIVE DRY WEATHER FLOW, SLUDGES GENERATED FROM NON-CONTACT ONCE-THROUGH COOLING WATERS SEGREGATED FOR TREATMENT FROM OTHER PROCESS OR OILY COOLING WATERS, SLUDGES AND FLOATS GENERATED IN AGRESSIVE BIOLOGICAL TREATMENT UNITS (INCLUDING SLUDGES AND FLOATS GENERATED IN ONE OR MORE ADDITIONAL UNITS AFTER WASTEWATERS HAVE BEEN TREATED IN AGGRESSIVE GIOLOGICAL TREATMENT UNITS) AND F037,K048, AND K051 WASTES ARE NOT INCLUDED IN THIS LISTING.
F039	LEACHATE FROM DISPOSAL OF MORE THAN ONE RESTRICTED WASTE (HAZARDOUS UNDER SUBPART D; RESULTING FROM THE DISPOSAL OF ONE OR MORE OF EPA HAZARDOUS WASTES: F020, F021, F022, F026, F027, AND/OR F028)
K001	WASTEWATER TREATMENT SLUDGE BOTTOM SEDIMENT THAT USE CREOSOTE AND/OR PENTACHLOROPHENOL
K002	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHROME YELLOW AND ORANGE PIGMENTS
K003	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF MOLYBDATE ORANGE PIGMENTS
K004	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF ZINC YELLOW PIGMENTS

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
K005	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHROME GREEN PIGMENTS
K006	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHROME OXIDE GREEN PIGMENTS (ANHYDROUS AND HYDRATED)
K007	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF IRON BLUE PIGMENTS
K008	OVEN RESIDUE FROM PRODUCTION OF CHROME OXIDE GREEN PIGMENTS
K009	DISTILLATION BOTTOMS FROM THE PRODUCTION OF ACETALDEHYDE FROM ETHYLENE
K010	DISTILLATION SIDE CUTS FROM PRODUCTION OF ACETALDEHYDE FROM ETHYLENE
K014	VICINALS FROM THE PURIFICATION OF TOLUENEDIAMINE IN THE PRODUCTION OF TOLUENEDIAMINE VIA THE HYDROGENATION OF DINITROTOLUENE
K015	STILL BOTTOMS FROM DISTILLATION OF BENZYL CHLORIDE
K016	HEAVY ENDS OR DISTILLATION RESIDUES FROM PRODUCTION OF CARBON TETRACHLORIDE
K017	HEAVY ENDS (STILL BOTTOMS) FROM PURIFICATION COLUMN IN PRODUCTION OF EPICHLOROHYDRIN
K018	HEAVY ENDS FROM FRACTIONATION COLUMN IN ETHYL CHLORIDE PRODUCTION
K019	HEAVY ENDS FORM THE DISTILLATION OF ETHYLENE DICHLORIDE IN ETHYLENE DICHLORIDE PRODUCTION
K020	HEAVY ENDS FROM DISTILLATION OF VINYL CHLORIDE IN VINYL CHLORIDE MONOMER PRODUCTION
K022	DISTILLATION BOTTOM TARS FROM PRODUCTION OF PHENOL/ACETONE FROM CUMENE
K023	DISTILLATION LIGHT ENDS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM NAPHTHALENE
K024	DISTILLATION BOTTOMS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM NAPHTHALENE
K025	DISTILLATION BOTTOMS FROM THE PRODUCTION OF NITROBENZENEBY THE NITRATION OF BENZENE
K026	STRIPPING STILL TAILS FROM PRODUCTION OF METHY ETHYL PYRIDINES
K029	WASTE FROM PRODUCT STEAM STRIPPER IN PRODUCTION OF 1,1,1-TRICHLOROETHANE
K030	COLUMN BOTTOMS OR HEAVY ENDS FROM COMBINED PRODUCTION OF TRICHLOROETHYLENE AND PERCHLOROETHYLENE
K031	BY-PRODUCT SALTS GENERATED IN PRODUCTION OF MSMA AND CACODYLIC ACID
K032	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHLORDANE
K033	WASTEWATER TREATMENT AND SCRUB WATER FROM CHLORINATION OF CYCLOPENTADIENE IN PRODUCTION OF CHLORDANE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
K034	FILTER SOLIDS FROM FILTRATION OF HEXACHLOROCYCLOPENTADIENE IN PRODUCTION OF CHLORDANE
K035	WASTEWATER TREATMENT SLUDGES GENERATED IN PRODUCTION OF CREOSOTE
K036	STILL BOTTOMS FROM TOLUENE RECLAMATION DISTILLATION IN PRODUCTION OF DISULFOTON
K037	WASTEWATER TREATMENT SLUDGES FROM PRODUCTION DISULFOTON
K038	WASTEWATER FROM WASHING AND STRIPPING OF PHORATE PRODUCTION
K039	FILTER CAKE FROM FILTRATIN OF DIETHYLPHOSPHORODITHIOIC ACID IN PRODUCTION OF PHORATE
K040	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF PHORATE
K041	WASTEWATER TREATMENT SLUDGE FORM PRODUCTION OF TOXAPHENE
K042	HEAVY ENDS OR DISTILLATION RESIDUES FROM DISTILLATION OF TETRACHLOROBENZENE IN PRODUCTION OF 2,4,5-T
K046	WASTEWATER TREATMENT SLUDGES FROM THE MANUFACTURING, FORMULATION AND LOADING OF LEAD-BASED INTIATING COMPOUNDS.
K048	DISSOLVED AIR FLOTATION FLOAT FROM PETROLEUM REFINING INDUSTRY
K049	SLOP OIL EMULSION SOLIDS FROM PETROLEUM REFINING INDUSTRY
K050	HEAT EXCHANGER BUNDLE CLEANING SLUDGE FROM PETROLEUM REFINING INDUSTRY
K051	API SEPARATOR SLUDGE FROM PETROLEUM REFINING INDUSTRY
K052	TANK BOTTOMS (LEADED) FROM PETROLEUM REFINING INDUSTRY
K061	EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES
K064	ACID PLANT BLOWDOWN SLURRY/SLUDGE RESULTING FROM THE THICKENING OF BLOWDOWN SLURRY FROM PRIMARY COPPER PRODUCTION
K065	SURFACE IMPOUNDMENT SOLIDS CONTAINED IN AND DREDGED FROM SURFACE IMPOUNDMENTS AT PRIMARY LEAD SMELTING FACILITIES.
K066	SLUDGE FROM TREATMENT OF PROCESS WASTEWATER AND/OR ACID PLANT BLOWDOWN FROM PRIMARY ZINC PRODUCTION
K071	BRINE PURIFICATION MUDS FROM MERCURY CELL PROCESS IN CHLORINE PRODUCTION WHERE SEPARATELY PREPURIFIED BRINE IS NOT USED
K073	CHLORINATED HYDROCARBON WASTE FROM PURIFICAITON STEP OF THE DIAPHRAGM CELL PROCESS USING GRAPHITE ANODES IN CHLORINE PRODUCTION
K083	DISTILLATION BOTTOMS FROM ANILINE PRODUCTION
K084	WASTEWATER TREATMENT SLUDGES GENERATED DURING PRODUCTION OF VETERINARY PHARMACEUTICALS FROM ARSENIC OR ORGANO-ARSENIC COMPOUNDS
K085	DISTILLATION OR FRACTIONATION COLUMN BOTTOMS FROM PRODUCTION OF CHLOROBENZENES

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
K086	SOLVENT WASHES AND SLUDGES, CAUSTIC WASHES AND SLUDGES, OR WATER WASHES AND SLUDGES FROM CLEANING TUBS AND EQUIPMENT USED IN FORMULATION OF INK FROM PIGMENTS, DRIERS, SOAPS, STABILIZERS CONTAINING CHROMIUM AND LEAD
K087	DECANTER TANK TAR SLUGE FROM COKING
K088	SPENT POTLINERS FROM PRIMARY ALUMINUM REDUCTION
K090	EMISSION CONTROL DUST OR SLUDGE FROM FERROCHROMIUMSILICON PRODUCTION
K091	EMISSION CONTROL DUST OR SLUDGE FROM FERROCHROMIUM PRODUCTION
K093	DISTILLAION LIGHT ENDS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM ORTHO-XYLENE
K094	DISTILLATION BOTTOMS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM ORTHO-XYLENE
K095	DISTILLAION BOTTOMS FROM PRODUCTION OF 1,1,1-TRICHLOROETHANE
K096	HEAVY ENDS FROM HEAVY ENDS COLUMN FROM PRODUCTION OF 1,1,1-TRICHLOROETHANE
K097	VACUUM STRIPPER DISCHARGE FROM CHLORDANE CHLORINATOR IN PRODUCTION OF CHLORDANE
K098	UNTREATED PROCESS WASTEWATER FROM PRODUCTION OF TOXAPHENE
K100	WASTE LEACHING SOLUTION FROM ACID LEACHING OF EMISSION CONTROL DUST/SLUDGE FROM SECONDARY LEAD SMELTING
K101	DISTILLATION TAR RESIDUES FROM DISTILLATIONOF ANILINE-BASED COMPOUNDS IN PRODUCTION OF VETERINARY PHARMACEUTICALS FROM ARSENIC OR ORGANO-ARSENIC COMPOUNDS
K102	RESIDUE FROM USE OF ACTIVATED CARBON FOR DECOLORIZATION IN PRODUCTION OF VETERINARY PHARMACEUTICALS FRO ARSENIC OR ORGANO-ARSENIC COMPOUNDS
K103	PROCESS RESIDUES FROM ANILINE EXTRACTION FROM PRODUCTIONOF ANILINE
K104	COMBINED WASTEWATER STREAMS GENERATED FROM NITROBENZENE/ANILINE PRODUCTION
K105	SEPARATED AQUEOUS STREAM FROM THE REACTOR PRODUCT WASHING STEP IN PRODUCTION OF CHLOROBENZENES
K106	WASTEWATER TREATMENT SLUDGE FROM MERCURY CELL PROCESS IN CHLORINE PRODUCTION
K112	REACTION BY-PRODUCT WATER FROM THE DRYING COLUMN IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE
K113	CONDENSED LIQUID LIGHT ENDS FROM THE PURIFICATIONOF TOLUENEDIAMINE IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE
K114	VICINALS FROM PURIFICAITON OF TOLUENEDIAMINE IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
K115	HEAVY ENDS FROM THE PURIFICATION OF TOLUENEDIAMINE IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE
K116	ORGANIC CONDENSATE FROM SOLVENT RECOVERY COLUMN IN PRODUCTION OF TOLUENE DIISOCYANATE VIA PHOSGENATION OF TOLUENEDIAMINE
K117	WASTEWATER FROM THE REACTOR VENT GAS SCRUBBER IN PRODUCTION OF ETHYLENE DIBROMIDE VIA BROMINATION OF ETHENE
K118	SPENT ADSORBENT SOLIDS FROM PURIFICATION OF ETHYLENE DIBROMIDE IN PRODUCTION OF ETHYLENE DIBROMIDE VIA BROMINATION OF ETHENE
K125	FILTRATION, EVAPORATION, AND CENTRIFUGATION SOLIDS FROM THE PRODUCTION OF ETHYLENEBISDITHIOCARBAMIC ACID AND ITS SALTS.
K126	BAGHOUSE DUST AND FLOOR SWEEPINGS IN MILLING AND PACKAGING OPERATIONS FROM PRODUCTION OR FORMULATION OF ETHYLENE BIS DITHIOCARBAMIC ACID AND ITS SALTS
P001	2H-1-BENZOPYRAN-2-ONE, 4-HYDROXY-3-(3-OXO-1-PHENYLBUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3% WARFARIN, & SALTS, WHEN PRESENT AT CONCENTRAIONS GREATER THAN 0.3%
P002	ACETAMINE, N-(AMINOTHIOXOMETHYL); Also known as 1-ACETYL-2-THIOUREA
P003	ACROLEIN; Also known as 2-PROPENAL
P004	ALDRIN; Also known as 1,4,5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXA-CHLORO-1,4,4A,5,8,8A,-HEXAHYDRO, (ALPHA, 4ALPHA, 4 ABETA, 5 ALPHA, 8ALPHA, 8ABETA)-
P005	ALLYL ALCOHOL; Also known as 2-PROPEN-1-OL
P007	5-(AMINOMETHYL)-3-ISOXAZOLOL; Also known as 3(2H)-ISOXAZOLONE, 5-(AMINOMETHYL)-
P008	4-AMINOPYRIDINE; Also known as 4-PYRIDINAMINE
P010	ARSENIC ACID H_3ASO_4
P011	ARSENIC OXIDE AS_2O_5; Also known as ARSENIC PENTOXIDE
P012	ARSENIC OXIDE AS_2O_3; Also known as ARSENIC TRIOXIDE
P013	BARIUM CYANIDE
P014	BENZENETHIOL; Also known as THIOPHENOL
P015	BERYLLIUM
P016	DICHLOROMETHYL ETHER; Also known as METHANE, OXYBIS[CHLORO-
P017	BROMOACETONE; Also known as 2-PROPANONE, 1-BROMO-
P018	BRUCINE
P020	DIOSEB; Also known as PHENOL, 2-(1-METHYLPROPYL)-4,6-DINITRO-
P021	CALCIUM CYANIDE; Also known as CALCIUM CYANIDE $CA(CN)_2$
P022	CARBON DISULFIDE
P023	ACETALDEHYDE, CHLORO-; Also known as CHLOROACETALDEHYDE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
P024	BENZENAMINE, 4-CHLORO-; Also known as P-CHLORANILINE
P026	1-(O-CHLOROPHENYL)THIOUREA; Also known as THIOUREA, (2-CHLOROPHENYL)-
P027	PROPANENITRILE, 3-CHLORO-; Also known as 3-CHLOROPROPIONITRILE
P028	BENZENE, (CHLOROMETHYL)-; Also known as BENZYL CHLORIDE
P029	COPPER CYANIDE; Also known as COPPER CYANIDE CU(CN)
P030	CYANIDES (SOLUBLE CYANIDE SALTS), NOT OTHERWISE SPECIFIED
P031	CYANOGEN; Also known as ETHANEDINITRILE
P033	CYANOGEN CHLORIDE; Also known as CYANOGEN CHLORIDE (CN)CL
P034	2-CYCLOHEXYL-4,6-DINITROPHENOL; Also known as PHENOL, 2-CYCLOHEXYL-4,6-DINITRO-
P036	ARSONOUS DICHLORIDE, PHENYL-; Also known as DICHLOROPHENYLARSINE
P037	DIELDRIN; Also known as 2,7:3,6-DIMETHANONAPHTH[2,3-B]OXIRENE, 3,4,5,6,9,9-HEXACHLORO-1A,2,2A,3,6,6A,7,7A-OCTAHYDRO-, (1AALPHA, 2BETS, 2AALPHA, 3BETAK, 6BETA, 6AALPHA, 7BETA, 7AALPHA)-
P038	ARSINE, DIETHYL-; Also known as DIETHYLARSINE
P039	PHOSPHORODITHIOIC ACID, O,O-DIETHYL S-[2-(ETHYLTHIO)ETHYL]ESTER; Also known as DISULFOTON
P040	O,O-DIETHYL O-PYRAZINYL PHOSPHOROTHIOATE; Also known as PHOSPHOROTHIOIC ACID, O, O-DIMETHYL O-(4 NITROPHENYL) ESTER
P041	PHOSPHORIC ACID, DIETHYL 4-NITROPHENYL ESTER; Also known as DIETHYL-P-NITROPHENYL PHOSPHATE
P042	1,2-BENZENEDIOL, 4-[HYDROXY-2-(METHYLAMINO)ETHYL]-,(R)-; Also known as EPINEPHRINE
P043	DIISOPROPYLFLUOROPHOSPHATE (DFP); Also known as PHOSPHOROFLUORIDIC ACID, BIS (1-METHYLETHYL)ESTER
P044	DIMETHOATE; Also known as PHOSPHORODITHIOIC ACID,O, O-DIMETHYL S-[2-(METHYLAMINO)-2-OXOETHYL]ESTER
P045	2-BUTANONE, 3, 3-DIMETHYL-1-(METHYITHIO)-,O-[METHYLOAMINO)CARBONYL]OXIME; Also known as THIOFANOX
P046	BENZENEETHANAMINE, ALPHA,ALPHA-DIMETHYL-; Also known as ALPHA,ALPHA-DIMETHYLPHENETHYLAMINE
P047	4,6-DINITRO-O-CRESOL, & SALTS; Also known as PHENOL,2-METHYL-4,6-DINITRO-, & SALTS
P048	2,4-DINITROPHENOL; Also known as PHENOL, 2,4-DINITRO-
P049	DITHIOBIURET; Also known as THIOIMIDODICARBONIC DIAMIDE $[H_2N)C(S)]_2NH$
P050	ENDOSULFAN; Also known as 6M9-METHANO-2,4,3-BENZODIOXATHIEPIN, 6,7,8,9,10,1K0-HEXACHLORO-1,5,5A,6,9,91-HEXAHYDRO-,3-OXIDE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
P051	2,7:3,6-DIMETHANONAPHTH [2,3-B]OXIRENE, 3,4,5,6,9,9-HEXACHLORO-1A,2,2A,3,6,6A,7,7A-OCTAHYDRO-, (1AALPHA, 2BETA, 2ABETA, 3ALPHA, 6ALPHA, 6ABETA, 7BETA, 7AALPHA)-, & METABOLITES; Also known as ENDRIN; Also known as ENDRIN, & METABOLITES
P054	AZIRIDINE; Also known as ETHYLENEIMINE
P056	FLUORINE
P057	ACETAMIDE, 2-FLUORO-; Also known as FLUOROACETAMIDE
P058	ACETIC ACID, FLUORO-,SODIUM SALT; Also known as FLUOROACETIC ACIDE, SODIUM SALT
P059	HEPTACHLOR; Also known as 4,7-METHANO-1H-INDENE, 1,4,5,6,7,8,-HEPTACHLORO-3A,4,7,7A-TETRAHYDRO-
P060	1,4,5,8-DIMETHANONAPHTHALENE,1,2,3,4,10,10-HEXA- CHLORO-1,4,4A,5,7,8,8A-HEXAHYDRO-(1ALPHA, 4ALPHA, 4ABETA, 5BETA,8BETA,8ABETA)-; Also known as ISODRIN
P062	HEXAETHYL TETRAPHOSPHATE; Also known as TETRAPHOSPHORIC ACID, HEXAETHYL ESTER
P063	HYDROCYANIC ACID; Also known as HYDROGEN CYANIDE
P064	METHANE, ISOCYANATO-
P066	ETHANIMIDOTHIOIC ACID, N-[[(METHYLAMINO)CARBONYL]OXY]-, METHYL ESTER; Also known as METHOMYL
P067	AZINIDINE, 2-METHYL; Also known as 1,2-PROPYLENIMINE
P068	HYDRAZINE, METHYL-; Also known as METHYL HYDRAZINE
P069	2-METHYLLACTONITRILE; Also known as PROPANENITRILE, 2-HYDROXY-2-METHYL-
P070	ALDICARB; Also known as PROPANAL, 2-METHYL-2-(METHYLTHIO)-, O-[(METHYLAMINO)CARBONYL]OXIME
P071	METHYL PARATHION; Also known as PHOSPHOROTHIOIC ACID, O, O,-DIMETHYL O-(4-NITROPHENYL)ESTER
P072	ALPHA-NAPHTHYLTHIOUREA; Also known as THIOUREA, 1-NAPHTHALENYL-
P073	NICKEL CARBONYL; Also known as NICKEL CARBONYL $NI(CO)_4$, (T-4)-
P074	NICKEL CYANIDE; Also known as NICKEL CYNAIDE $NI(CN)_2$
P075	NICOTINE, & SALTS; Also known as PYRIDINE, 3-(1-METHYL-2-PYRROLIDINYL)-, (S)-, & SALTS
P077	BENZENAMINE, 4-NITRO-; Also known as P-NITROANILINE
P078	NITROGEN DIOXIDE; Also known as NITROGEN OXIDE NO_2
P082	METHANAMINE, N-METHYL-N-NITROSO-; Also known as N-NITROSODIMETHYLAMINE
P084	N-NITROSOMETHYLVINYLAMINE; Also known as VINYLAMINE, N-METHYL-N-NITROSO-
P085	DIPHOSPHORAMIDE, OCTAMETHYL-; Also known as OCTAMETHYLPYROPHOSPHORAMIDE
P087	OSMIUM OXIDE OSO_4, (T-4)-; Also known as OSMIUM TETROXIDE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
P088	ENDOTHALL; Also known as 7-OXABICYCLO[2.2.1]HEPTANE-2,3-DICARBOXYLIC ACID
P089	PARATHION; Also known as PHOSPHORIC ACID, O,O-DIETHYL O-(4-NITROPHENYL)ESTER
P092	MERCURY, (ACETATO-O)PHENYL-; Also known as PHENYLMERCURY ACETATE
P093	PHENYLTHIOUREA; Also known as THIOUREA, PHENYL-
P094	PHORATE; Also known as PHOSPHORODITHIOIC ACID, O,O-DIETHYL; Also known as S-[ETHYLTHIO)METHYL] ESTER
P095	CARBONIC DICHLORIDE; Also known as PHOSGENE
P096	HYDROGEN PHOSPHIDE; Also known as PHOSPHINE
P097	FAMPHUR; Also known as PHOSPHOTHIOIC ACID, O-[4-[(DIMETHYLAMINO)SULFONYL]PHENYL] O,O-DIMETHYL ESTER
P098	POTASSIUM CYANIDE
P099	ARGENTATE(1-), BIS(CYANO-C)-, POTASSIUM; Also known as POTASSIUM SILVER CYANIDE
P101	ETHYL CYANIDE; Also known as PROPANENITRILE
P102	PROPARGYL ALCOHOL; Also known as 1-PROPYN-1-OL
P103	SELENOUREA
P104	SILVER CYANIDE
P105	SODIUM AZIDE
P108	STRYCHNIDIN-10-ONE, & SALTS; Also known as STRYCHNINE, & SALTS
P109	TETRAETHYLDITHIOPYROPHOSPHATE; Also known as THIODIPHOSPHIRIC ACID, TETRAETHYL ESTER
P110	TETRAETHYL LEAD
P113	THALLIUM OXIDE TL_2O_3
P114	THALLIUM(L) SELENITE
P115	THALLIUM(L) SULFATE
P116	THIOSEMICARBAZIDE
P118	TRICHLOROMETHANETHIOL
P119	VANADIC ACID, AMMONIUM SALT
P120	VANADIUM PENTOXIDE
P121	ZINC CYANIDE
P123	TOXAPHENE
U001	ACETALDEHYDE (I); Also known as ETHANAL (I)
U002	ACETONE (I); Also known as 2-PROPANONE (I)
U003	ACETONITRILE (I,T)
U004	ACETONITRILE (I,T)

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U005	2, ACETYLAMINOFLUORENE; Also known as ACETAMIDE, N-9H-FLUOREN-2-YL-
U007	ACRYLAMIDE; Also known as 2-PROPENAMIDE
U008	ACRYLIC ACID (I); Also known as 2-PROPENOIC ACID (I)
U009	ACRYLONITRILE; Also known as 2-PROPENENITRILE
U010	AZIRINO[2',3':3,4]PYRROLO[1,2-a]INDOLE-4,7-DIONE,6-AMINO-8-[[(AMINOCARBONYL)OXY]METHYL]-1,1a,2,8,8a,8b-HEXAHYDRO-8a-METHOXY-5-METHYL-, [1aS-(1AALPHA, 8BETA, 8AALPHA, 8BALPHA)]-; Also known as MITOMYCIN C
U011	AMITROLE; Also known as 1H-1,2,-TRIAZOL-3-AMINE
U012	ANILINE (I,T); Also known as BENZENAMINE (I,T)
U014	AURAMINE; Also known as BENZENAMINE, 4,4'-CARBONIMIDOYLBIS[N,N-DIMETHYL-
U015	AZASERINE; Also known as L-SERINE, DIAZOACETATE (ESTER)
U016	BENZ[C]ACRIDINE
U017	BENZAL CHLORIDE; Also known as BENZENE,(DICHLOROMETHYL)-
U018	BENZ[A]ANTHRACENE
U019	BENZENE (I,T)
U022	BENZO[A]PYRENE
U024	DICHLOROMETHOXY ETHANE; Also known as ETHANE, 1,1'-[METHYLENEBIS(OXY)]BIS[2-CHLORO-
U025	DICHLOROETHYL ETHER; Also known as ETHANE,1,1'-OXYBIS[2-CHLORO-
U026	CHLORNAPHAZIN; Also known as NAPHTHALENAMINE, N,N'-BIS(2-CHLOROETHYL)-
U027	DICHLOROISOPROPYL ETHER; Also known as PROPANE, 2,2'-OXYBIS[2-CHLORO-
U028	1,2-BENZENEDICARBOXYLIC ACID, BIS(2-ETHYLHEXYL) ESTER; Also known as DIETHYLHEXYL PHTHALATE
U029	METHANE, BROMO-; Also known as METHYL BROMIDE
U030	BENZENE, 1-BROMO-4-PHENOXY-; Also known as 4-BROMOPHENYL PHENYL ETHER
U031	1-BUTANOL (I); Also known as N-BUTYL ALCOHOL (I)
U032	CHROMIC ACID H_2CRO_4, CALCIUM SALT; Also known as CALCIUM CHROMATE
U034	CHLORAL; Also known as ACETALDEHYDE, TRICHLORO-
U035	CHLORAMBUCIL; Also known as BENZENEBUTANOIC ACID, 4-[BIS(2-CHLOROETHYL)AMINO]-
U036	CHLORDANE, ALPHA & GAMMA ISOMERS; Also known as 4,7-METHANO-1H-INDENE, 1,2,4,5,6,7,8,8-OCTACHLORO-2,3,3A,4,7,7A-HEXAHYDRO-
U037	CHLOROBENZENE; Also known as BENZENE, CHLORO-
U038	CHLOROBENZILATE; Also known as BENZENEACETIC ACID, 4-CHLORO-ALPHA-(4-CHLOROPHENYL)-ALPHA-HYDROXY-, ETHYL ESTER
U039	P-CHLORO-M-CRESOL; Also known as PHENOL, 4-CHLORO-3-METHYL-
U041	EPICHLOROHYDRIN; Also known as OXIRANE, (CHLOROMETHYL)-

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U042	2-CHLOROETHYL VINYL ETHER; Also known as ETHENE, (2-CHLOROETHOXY)-
U043	VINYL CHLORIDE; Also known as ETHENE, CHLORO-
U044	CHLOROFORM; Also known as METHANE, TRICHLORO-
U045	METHANE, CHLORO- (I,T); Also known as METHYL CHLORIDE (I,T)
U046	CHLOROMETHYL METHYL ETHER; Also known as METHANE, CHLOROMETHOXY-
U047	BETA-CHLORONAPHTHALENE; Also known as NAPHTHALENE, 2-CHLORO-
U048	O-CHLOROPHENOL; Also known as PHENOL, 2-CHLORO-
U049	4-CHLORO-O-TOLUIDINE, HYDROCHLORIDE; Also known as BENZENAMINE, 4-CHLORO-2-METHYL, HYDROCHLORIDE
U050	CHRYSENE
U051	CREOSOTE
U052	CRESOL (CRESYLIC ACID); Also known as PHENOL, METHYL-
U053	CROTONALDEHYDE; Also known as 2-BUTENAL
U055	CUMENE (I); Also known as BENZENE, (1-METHYLETHYL)- (I)
U056	BENZENE, HEXAHYDRO- (I); Also known as CYCLOHEXANE (I)
U057	CYCLOHEXANONE (I)
U058	CYCLOPHOSPHAMIDE; Also known as 2H-1,3,2-OXAZAPHOSPHORIN-2-AMINE, N,N-BIS (2-CHLOROETHYL)TETRAHYDRO-, 2-OXIDE
U059	DAUNOMYCIN; Also known as 5,12-NAPHTHACENEDIONE, 8-ACETYL-10-[(3-AMINO-2,3,6-TRIDEOXY)-ALPHS-L-LYXO-HEXOPYRANOSY)OXY]-7,8,9,10-TETRAHYDRO-6,8,11-TRIHYDROXY-1-METHOXY-, (8S-CIS)-
U060	DDD; Also known as BENZENE, 1,1'-(2,2-DICHLOROETHYLIDENE)BIS[4-CHLORO-
U061	DDT; Also known as BENZENE, 1,1'-(2,2,2-TRICHLOROETHYLIDENT)BIS[4-CHLORO-
U062	DIALLATE; Also known as CARBAMOTHIOIC ACID, BIS(1-METHYLETHYL)-, S-(2,3-DICHLORO-2-PROPENYL) ESTER
U063	DIBENZ[A,H]ANTHRACENE
U064	DIBENZO[A,I]PYRENE; Also known as BENZO[RST]PENTAPHENE
U066	1,2-DIBROMO-3-CHLOROPROPANE; Also known as PROPANE, 1,2-DIBROMO-3-CHLORO-
U067	ETHANE, 1,2-DIBROMO-; Also known as ETHYLENE DIBROMIDE
U068	METHANE, DIBROMO-; Also known as METHYLENE BROMIDE
U069	DIBUTYL PHTHALATE; Also known as 1,2-BENZENEDICARBOXYLIC ACID, DIBUTYL ESTER
U070	o-DICHLOROBENZENE; Also known as BENZENE, 1,2-DICHLORO-
U071	m-DICHLOROBENZENE; Also known as BENZENE, 1,3-DICHLORO-
U072	p-DICHLOROBENZENE; Also known as BENZENE, 1,4-DICHLORO-

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U073	3,3'-DICHLOROBENZIDINE; Also known as [1,1'-BIPHENYL]-4,4'-DIAMINE, 3,3'DICHLORO-
U074	1,4-DICHLORO-2-BUTENE (I,T); Also known as 2-BUTENE, 1,4-DICHLORO- (I,T)
U075	DICHLORODIFLUOROMETHANE; Also known as METHANE, DICHLORODIFLUORO-
U076	ETHANE, 1,1-DICHLORO-; Also known as ETHYLIDENE DICHLORIDE
U077	ETHANE, 1,2-DICHLORO-; Also known as ETHYLENE DIBROMIDE
U078	1,1-DICHLOROETHYLENE; Also known as ETHENE, 1,1-DICHLORO-
U079	1,2-DICHLOROETHYLENE; Also known as ETHENE, 1,2-DICHLORO-, (E)
U080	METHANE, DICHLORO-; Also known as METHYLENE CHLORIDE
U081	2,4-DICHLOROPHENOL; Also known as PHENOL, 2,4-DICHLORO-
U082	2,6-DICHLOROPHENOL; Also known as PHENOL,2,6-DICHLORO-
U083	PROPANE, 1,2-DICHLORO-; Also known as PROPYLENE DICHLORIDE
U084	1,3-DICHLOROPROPENE; Also known as 1-PROPENE, 1,3-DICHLORO-
U085	1,2:3,4--DIEPOXYBUTANE (I,T); Also known as 2,2'-BIOXIRANE
U086	N,N'-DIETHYLHYDRAZINE; Also known as HYDRAZINE, 1,2,-DIETHYL-
U087	O,O-DIETHYL S-METHYL DITHIOPHOSPHATE; Also known as PHOSPHORODITHIOIC ACID, 0,0-DIETHYL S-METHYL ESTER
U088	DIETHYL PHTHALATE; Also known 1,2-BENZENEDICARBOXYLIC ACID, DIETHYL ESTER
U089	DIETHYLSTILBESTEROL; Also known as PHENOL, 4,4'-(1,2-DIETHYL-1,2-ETHENEDIYL)BIS-, (E)
U090	DIHYDROSAFROLE; Also known as 1,3-BENZODIOXOLE, 5-PROPYL-
U091	3,3'-DIMETHOXYBENZIDINE; Also known as [1,1'-BIPHENYL]-4,4'-DIAMINE, 3,3'DIMETHOXY-
U092	DIMETHYLAMINE (I); Also known as METHANAMINE, N-METHYL- (I)
U093	BENZENAMINE, N,N-DIMETHYL-4-(PHENYLAZO)-; Also known as P-DIMETHYLAMINOAZOBENZENE
U094	BENZ[A]ANTHRACENE, 7,12-DIMETHYL-; Also known as 7,12-DIMETHYLBENZ[A]ANTHRACENE
U095	3,3'-DIMETHYLBENZIDINE; Also known as [1,1'-BIPHENYL]-4,4'-DIAMINE, 3,3'DIMETHYL-
U097	DIMETHYLCARBAMOYL CHLORIDE; Also known as CARBAMIC CHLORIDE, DIMETHYL-
U098	1,1-DIMETHYLHYDRAZINE; Also known as HYDRAZINE, 1,1-DIMETHYL-
U099	1,2-DIMETHYLHYDRAZINE; Also known as HYDRAZINE, 1,2,-DIMETHYL-
U101	2,4-DIMETHYLPHENOL; Also known as PHENOL, 2,4-DIMETHYL-
U102	DIMETHYL PHTHALATE; Also known as 1,2-BENZENEDICARBOXYLIC ACID, DIMETHYL ESTER
U103	DIMETHYL SULFATE; Also known as SULFURIC ACID, DIMETHYL ESTER

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U105	2,4-DINITROTOLUENE; Also known as BENZENE, 1-METHYL-2,4-DINITRO-
U106	2,6-DINITROTOLUENE; Also known as BENZENE, 2-METHYL-1,3-DINITRO-
U107	DI-N-OCTYL PHTHALATE; Also known as 1,2-BENZENEDICARBOXYLIC ACID, DIOCTYL ESTER
U108	1,4-DIETHYLENEOXIDE; Also known as 1,4-DIOXANE
U109	1,2-DIPHENYLHYDRAZINE; Also known as HYDRAZINE, 1,2-DIPHENYL-
U110	DIPROPYLAMINE (I); Also known as 1-PROPANAMINE, N-PROPYL- (I)
U111	DI-N-PROPYLNITROSAMINE; Also known as 1-PROPANAMINE, N-NITROSO-N-PROPYL-
U112	ACETIC ACID ETHYL ESTER (I); Also known as ETHYL ACETATE (I)
U113	ETHYL ACRYLATE (I); Also known as 2-PROPENOIC ACID, ETHYL ESTER (I)
U114	ETHYLENEBISDITHIOCARBAMIC ACID, SALTS & ESTERS; Also known as CARBAMODITHIOIC ACID, 1,2- ETHANEDIYLBIS-, SALTS & ESTERS
U115	ETHYLENE OXIDE (I,T); Also known as OXIRANE (I,T)
U116	ETHYLENETHIOUREA; Also known as 2-IMIDAZOLIDINETHIONE
U117	ETHANE, 1,1'-OXYBIS-(I); Also known as ETHYL ETHER (I)
U118	ETHYL METHACRYLATE; Also known as 2-PROPENOIC ACID, 2-METHYL-, ETHYL ESTER
U119	ETHYL METHANESULFONATE; Also known as METHANESULFONIC ACID, ETHYL ESTER
U120	FLUORANTHENE
U121	TRICHLOROMONOFLUOROMETHANE; Also known as METHANE, TRICHLOROFLUORO-
U122	FORMALDEHYDE
U124	FURAN (I); Also known as FURFURAN (I)
U125	2-FURANCARBOXALDEHYDE (I); Also known as FURFURAL (I)
U126	GLYCIDYLALDEHYDE; Also known as OXIRANECARBOXYALDEHYDE
U127	HEXACHLOROBENZENE; Also known as BENZENE, HEXACHLORO-
U128	HEXACHLOROBUTADIENE; Also known as 1,3-BUTADIENE, 1,1,2,3,4,4-HEXACHLORO-
U129	LINDANE; Also known as CYCLOHEXANE, 1,2,3,4,5,6- HEXACHLORO-, (1ALPHA, 2ALPHA, 3BETA, 4ALPHA, 5ALPHA, 6BETA)-
U130	HEXACHLOROCYCLOPENTADIENE; Also known 1,3-CYCLOPENTADIENE, 1,2,3,4,5,5-HEXACHLORO-
U131	HEXACHLOROETHANE; Also known as ETHANE, HEXACHLORO-
U132	HEXACHLOROPHENE; Also known as PHENOL, 2,2'-METHYLENEBIS[3,4,6-TRICHLORO-
U135	HYDROGEN SULFIDE; Also known HYDROGEN SULFIDE H_2S
U136	ARSINIC ACID, DIMETHYL-; Also known as CACODYLIC ACID
U137	INDENO[1,2,3-CD]PYRENE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U138	METHANE, IODO-; Also known as METHYL IODIDE
U140	ISOBUTYL ALCOHOL, (I,T); Also known as 1-PROPANOL, 2-METHYL-, (I,T)
U141	ISOSAFROLE; Also known as 1,3-BENZODIOXOLE, 5-(1-PROPENYL)-
U142	KEPONE; Also known as 1,3,4-METHENO-2H-CYCLOBUTA[CD]PENTALEN-2-ONE, 1,1A,3,3A,4,5,5A,5B,6- DECACHLOROOCTAHYDRO-
U143	LASIOCARPINE; Also known as 2-BUTENOIC ACID, 2-METHYL-, 7-[2,3-DIHYDROXY-2-(1-METHOXYETHYL)-3-METHYL-1- OXOBUTOXY]METHYL]-2,3,5,6A-TETRAHYDRO-1H-PYRROLIZIN-1-YL ESTER,[1S-1ALPHA(Z),7(2S*,3R*),7AALPHA]]-
U144	ACETIC ACID, LEAD(2+) SALT; Also known as LEAD ACETATE
U145	LEAD PHOSPHATE; PHOSPHORIC ACID, LEAD(2+) SALT (2:3)
U146	LEAD, BIS(ACETATO-O) TETRAHYDROXYTRI-; Also known as LEAD SUBACETATE
U147	MALEIC ANHYDRIDE; Also known as 2,5-FURANDIONE
U148	MALEIC HYDRAZIDE; Also known as 3,6-PYRIDAZINEDIONE, 1,2-DIHYDRO-
U149	MALONONITRILE; Also known as PROPANEDINITRILE
U150	MELPHALAN; Also known as L-PHENYLALANINE, 4-[BIS(2-CHLOROETHYL)AMINO]-
U151	MERCYR
U152	METHACRYLONITRILE (I,T); Also known as 2-PROPENENITRILW, 2-METHYL- (I,T)
U153	METHANETHIOL (I,T); Also known as THIOMETHANOL (I,T)
U154	METHANOL (I); Also known as METHYL ALCOHOL (I)
U155	METHAPYRILENE; Also known 1,2-ETHANEDIAMINE, N,N- DIMETHYL-N'-W-PYRIDINYL-N'-(2- THIENYLMETHYL)-
U156	METHYL CHLOROCARBONATE (I,T); Also known CARBONOCHLORIDIC ACID, METHYL ESTER (I,T)
U157	BENZ[I]ACEANTHRYLENE, 1,2-DIHYDRO-3-METHYL-; Also known as 3-METHYLCHOLANTHRENE
U158	BENZENAMINE, 4,4'METHYLENEBIS[2-CHLORO-; Also known as 4,4'-METHYLENEBIS(2-CHLOROANILINE)
U159	METHYL ETHYL KETONE (MEK) (I,T); Also known as 2-BUTANONE (I,T)
U161	METHYL ISOBUTYL KETONE (I); Also known as 4-METHYL-2-PENTANONE (I) and PENTANOL, 4-METHYL-
U162	METHYL METHACRYLATE (I,T); Also known as 2-PROPENOIC ACID, 2-METHYL-, METHYL ESTER (I,T)
U163	MNNG; Also known as GUANIDINE, N-METHYL-N'-NITRO-N- NITROSO-
U164	METHYLTHIOURACIL; Also known as 4(1H)-PYRIMIDINONE, 2,3-DIHYDRO-6-METHYL-2-THIOXO-
U165	NAPHTHALENE
U166	1,4-NAPHTHALENEDIONE; Also known as 1,4-NAPHTHOQUINONE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U167	1-NAPHTHALENAMINE; Also known as ALPHA-NAPHTHYLAMINE
U168	2-NAPHTHALENAMINE; Also known as BETA-NAPHTHYLAMINE
U169	NITROBENZENE (I,T); Also known as BENZENE, NITRO-
U170	P-NITROPHENOL; Also known as PHENOL, 4-NITRO
U171	2-NITROPROPANE (I,T); Also known as PROPANE, 2-NITRO (I,T)
U172	N-NITROSODI-N-BUTYLAMINE; Also known as 1-BUTANAMINE, N-BUTYL-N-NITROSO-
U173	N-NITROSODIETHANOLAMINE; Also known as ETHANOL, 2,2'-(NITROSOIMINO)BIS-
U174	N-NITROSODIETHYLAMINE; Also known as ETHANAMINE, N-ETHYL-N-NITROSO-
U176	N-NITROSO-N-ETHYLUREA; Also known as UREA, N-ETHYL-N-NITROSO-
U177	N-NITROSO-N-METHYLUREA; Also known as UREA, N-METHYL-N-NITROSO-
U178	N-NITROSO-N-METHYLURETHANE; Also known as CARBAMIC ACID, METHYLNITROSO-,ETHYL ESTER
U179	N-NITROSOPIPERIDINE; Also known as PIPERIDINE, 1-NITROSO-
U180	N-NITROSOPYRROLIDINE; Also known as PYRROLIDINE, 1-NITROSO-
U181	BENZENAMINE, 2-METHYL-5-NITRO-; Also known as 5-NITRO-O-TOLUIDINE
U182	PARALDEHYDE; Also known as 1,3,5-TRIOXANE, 2,4,6- TRIMETHYL-
U183	PENTACHLOROBENZENE; Also known as BENZENE, PENTACHLORO-
U184	PENTACHLOROETHANE; Also known as ETHANE, PENTACHLORO-
U185	PENTACHLORONITROBENZENE (PCNB); Also known as BENZENE, PENTACHLORONITRO-
U186	1,3-PENTADIENE (I); Also known as 1-METHYLBUTADIENE (I)
U187	ACETAMIDE, N-(4-ETHOXYPHENYL)-; Also known as PHENACETIN
U188	PHENOL
U190	PHTHALIC ANHYDRIDE; Also known as 1,3-ISOBENZOFURANDIONE
U191	2-PICOLINE; Also known as PYRIDINE, 2-METHYL-
U192	BENZAMIDE,3,5-DICHLORO-N-(1,1-DIMETHYL-2-PROPYNYL)-; Also known as PRONAMIDE
U193	1,3-PROPANE SULTONE; Also known as 1,2-OXATHIOLANE, 2,2-DIOXIDE
U194	1-PROPANAMINE (I,T); Also known as N-PROPYLAMINE (I,T)
U196	PYRIDINE
U197	P-BENZOQUINONE; Also known as 2,5-CYCLOHEXADIENE-1,4-DIONE
U200	RESERPINE; Also known as YOHIMBAN-16-CARBOXYLIC ACID, 11,17-DIMETHOXY-18-[(3,4,5-TRIMETHOXYBENZOYL)OXY]-, METHYL ESTER, (3BETA, 16BETA, 17ALPHA, 18BETA, 20ALPHA)-
U201	RESORCINOL; Also known as 1,3-BENZENEDIOL
U202	SACCHARIN, & SALTS; Also known as 1,2-BENZISOTHIAZOL-3(2H)-ONE, 1,1-DIOXIDE, & SALTS

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U203	SAFROLE; Also known as 1,3-BENZODIOXOLE, 5-(2- PROPENYL)-
U204	SELENIOUS ACID; Also known as SELENIUM DIOXIDE
U206	STREPTOZOTOCIN; Also known as GLUCOPYRANOSE, 2-DEOXY-2-(3-METHYL-3-NITROSOUREIDO)-, D-D-GLUCOSE, 2-DEOXY-2-[[(METHYLNITROSOAMINO)-CARBONYL]AMINO]-
U207	1,2,4,5-TETRACHLOROBENZENE; Also known as BENZENE, 1,2,4,5-TETRACHLORO-
U208	1,1,1,2-TETRACHLOROETHANE; Also known as ETHANE, 1,1,1,2-TETRACHLORO-
U209	1,1,2,2-TETRACHLOROETHANE; Also known as ETHANE, 1,1,2,2-TETRACHLORO-
U210	TETRACHLOROETHYLENE; Also known as ETHENE, TETRACHLORO-
U211	CARBON TETRACHLORIDE; Also known as METHANE, TETRACHLORO-
U213	TETRAHYDROFURAN (I); Also known as FURAN, TETRAHYDRO-(I)
U214	ACETIC ACID, THALLIUM(1+) SALT; Also known as THALLIUM(I) ACETATE
U215	THALLIUM(I) CARBONATE; Also known as CARBONIC ACID, DITHALLIUM(1+) SALT
U216	THALLIUM(I) CHLORIDE; Also known as THALLIUM CHLORIDE TLCL
U217	THALLIUM(I) NITRATE; Also known as NITRIC ACID, THALLIUM(1+) SALT
U218	THIOACETAMIDE; Also known as ETHANETHIOAMIDE
U219	THIOUREA
U220	TOLUENE; Also known as BENZENE, METHYL-
U221	TOLUENEDIAMINE; Also known as BENZENEDIAMINE, AR-METHYL-
U222	BENZENAMINE, 2-METHYL-, Also known as HYDROCHLORIDE O-TOLUIDINE HYDROCHLORIDE
U225	BROMOFORM; Also known as METHANE, TRIBROMO-
U226	ETHANE, 1,1,1-TRICHLORO-; Also known as METHYL CHLOROFORM
U227	1,1,2-TRICHLOROETHANE; Also known as ETHANE, 1,1,2-TRICHLORO-
U228	TRICHLOROETHYLENE; Also known as ETHENE, TRICHLORO-
U235	TRIS(2,3-DIBROMOPROPYL) PHOSPHATE; Also known as 1-PROPANOL, 2,3-DIBROMO-, PHOSPHATE (3:1)
U236	TRYPAN BLUE; Also known as 2,7-NAPHTHALENEDISULFONIC ACID, 3,3'-[(3,3'-DIMETHYL[1,1'-BIPHENYL]-4,4'- DIYL)BIS(AZO)BIS[5-AMINO-4-HYDROXY]-, TETRASODIUM SALT
U237	URACIL MUSTARD; Also known as 2,4-(1H,3H)-PYRIMIDINEDIONE, 5-[BIS(2-CHLOROETHYL)AMINO]-
U238	CARBAMIC ACID, ETHYL ESTER; Also known as ETHYL CARBAMATE (URETHANE)
U239	XYLENE (I); Also known as BENZENE, DIMETHYL- (I,T)
U240	ACETIC ACID, 92,4-DICHLOROPHENOXY)-, SALTS & ESTERS; Also known as 2,4-D, SALTS & ESTERS
U243	HEXACHLOROPROPENE; Also known as 1-PROPENE, 1,1,2,3,3,3- HEXACHLORO-

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	**WASTE DESCRIPTION**
U244	THIOPEROXYDICARBONIC DIAMIDE $[(H_2N)C(S)]_2S_2$, TETRAMETHYL-; Also known as THIRAM
U246	CYANOGEN BROMIDE (CN)Br
U247	BENZENE, 1,1'(2,2,2-TRICHLOROETHYLIDENE)BIS[4-METHOXY-; Also known as METHOXYCHLOR
U248	WARFARIN, & SALTS, WHEN PRESENT AT CONCENTRATIONS OF 0.3% OR LESS; Also known as 2H-1-BENZOPYRAN-2-ONE, 4- HYDROXY-3-(3-OXO-1-PHENYL-BUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS OF 0.3% OR LESS
U249	ZINC PHOSPHIDE Zn_3P_2 WHEN PRESENT AT CONCENTRATIONS OF 10% OR LESS
U328	BENZENAMINE, 2-METHYL-; Also known as o-TOLUIDINE
U353	BENZENAMINE, 4-METHYL-; Also known as p-TOLUIDINE
U359	ETHANOL, 2-ETHOXY-; Also known as ETHYLENE GLYCOL MONOETHYL ETHER

ATTACHMENT 2

EPA INCINERATOR CLOSURE GUIDANCE

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Draft Guidance on Incinerator Closure

FROM: Lionel Vega, Chemical Engineer
Alternative Technology Section

TO: Addressees

Attached is the draft guidance on incinerator closure for your review and comment. As described in the agenda, I will be asking for your comments on this eight-page draft guidance in our workgroup meeting scheduled for November 7-9 in Denver, Colorado.

Attachment

Addressees:

Stephen Yee, Region I
John Brogard, Region II
Gary Gross, Region III
Betty Willis, Region IV
Glen Hay, Region IV
Hugh Hazen, Region IV
Y.J. Kim, Region V
Mardi Klevs, Region V
Stan Burger, Region VI
Joe Galbraith, Region VII
Nat Miullo, Region VIII
Larry Bowerman, Region IX
Cathy Massimino, Region X

Larry Johnson, ORD
Joe McSorley, ORD
C.C. Lee, ORD
Donald Oberacker, ORD
George Huffman, ORD
Justice Manning, ORD
Bob Mouringham, ORD

cc: Lionel Vega
Sonya Sasseville
Bob Holloway
Shiva Garg
Dwight Hlustick
Kate Anderson, OWPE
Charles Perry, OWPE
Winston Lue, OTS
Cristina Gaines, OWEP

Printed on Recycled Paper

DRAFT OF GUIDANCE OF INCINERATOR CLOSURE

Draft Final Report

For U.S. Environmental Protection Agency

Submitted by:

Midwest Research Institute
5109 Leesburg Pike
Suite 414
Falls Church, Virginia

EPA Contract No. 68-01-7310
Work Assignment 134
MRI Project No. 8962-34

June 29, 1990

PREFACE

This draft document was prepared by Midwest Research Institute (MRI) for the U.S. Environmental Protection Agency (EPA) under subcontract to NUS Corporation on EPA Contract No. 68-01-7310. The document was developed by Bruce Boomer.

MIDWEST RESEARCH INSTITUTE

Andrea C. Hall, Ph.D.
Program Manager

June 29, 1990

DRAFT

GUIDANCE ON CLOSURE PROCEDURES FOR HAZARDOUS WASTE INCINERATOR FACILITIES

INTRODUCTION

This memo provides RCRA permit writers with recommended procedures for the incinerator-specific portion of a closure plan. Owners and operators of a hazardous waste incinerator facility must develop a plan for closing the facility and must keep the plan on file at the facility until closure is completed and certified. The closure plan is a required portion of a RCRA Part B permit application and is thus subject to the approval of RCRA permit writers.

This memo addresses closure of the incinerator and ancillary equipment. Issues addressed below include initial decontamination and burnout of any residual organic contamination, further decontamination methods, confirmatory sampling methods, and criteria for closure certification. This memo does not address tank closure or other general facility closure requirements such as the cleanup of any spills or contaminated soils.

Typically, the closure of a permitted RCRA incinerator is not an issue with significant environmental impact. If the facility had been operating in compliance with permit conditions prior to closure, the amount and extent of residual contamination within the incinerator and ancillary equipment is expected to be minimal; the recommendations discussed in this memo address this expectation of minimal contamination.

EPA PRECEDENT

An issue associated with incinerator closure is defining an "acceptable" level of residual contamination to allow material previously in contact with hazardous wastes to be recycled or disposed as a nonhazardous waste. In a letter to Mr. Thomas Jorling dated June 19, 1989, Jonathan Cannon, Acting Assistant Administrator of EPA (see Attachment 1), noted that contaminated environmental media must be managed as if they were hazardous until they no longer contain the listed wastes. Options mentioned in the letter include: (1) delisting, (2) removing the contamination by treatment, or (3) decontamination to an acceptable minimal level of contamination. The letter notes that for the third option, EPA is investigating de minimus levels for hazardous constituents, below which materials (such as contaminated environmental media) would no longer have to be managed as hazardous wastes.

The sections below provide a closure approach for potentially contaminated incinerator media that involves, to some extent, options number two and three above.

APPROACH TO INCINERATOR CLOSURE

Residual contamination of environmental concern within an incineration system will result from the organic and metals content of the wastes fed to the incinerator. The following steps (summarized in Table 1) provide a basis for organic decontamination and determination of residual metal contamination.) The first step of incinerator closure involves the incineration of all existing hazardous waste inventories and proper treatment, disposal, or removal of residual wastes such as incinerator ash, scrubber effluents, and baghouse ash. For most facilities, this step effectively removes the most significant source of residual contamination for closure.

The second step involves the active decontamination of waste feed mechanisms by use of chemical and/or physical action. This step may be coordinated with affiliated storage tank or drum closure activities, which parallel and inter-relate to incinerator closure.

During the second step, feed mechanisms (e.g., liquid/sludge feed lines, solid feed mechanisms) are rinsed with kerosene or other appropriate solvents to remove surface contaminants. Table 2 provides a general guide to the solubility of several contaminant categories in water, dilute acids, dilute bases, and organic solvents. Feed mechanisms also may be scrubbed or scraped using brushes, scrapers, or sponges and water-compatable solvent cleaning solutions. All rinsate is to be collected and incinerated prior to step 3.

The third step is a burnout of any residual organic contamination within the incinerator. Following the completion of step 2, the incinerator will be operated with only auxiliary fuel for an appropriate time period not less than 4 hr, maintaining at least the minimum temperature specified in the permit for each combustion chamber. This is expected to combust any remaining organic contaminants within the incinerator system.

After the completion of step 3, the incinerator and its ancillary equipment may be considered to be organically decontaminated. Organic contamination is not expected downstream from the combustion chambers (e.g., air pollution control devices). However, residual contamination with metals remains a concern. Step 4 addresses the decontamination and wipe sampling of incinerator components in regard to metals. The following are examples of components of concern:

- Feed mechanisms (piping, pumps, conveyors, etc.);
- Refractory of combustion chambers;
- Gas ducts;
- Ash handling system;
- Internal surfaces of air pollution control equipment; and,
- Stack.

(Excluded from the decontamination procedures are fabric filter bags and scrubber packing materials which can be disposed as hazardous wastes.)

The recommendations for step 4 include:

- Optional rinse/scrub of above equipment with detergent;
- Wipe sampling (minimum 10 locations scattered throughout above).

The optional rinse/scrub may involve a combination of both physical and chemical means to remove contaminants. As previously discussed for step 2, individual components (detached as appropriate) may be scrubbed or scraped using brushes, scrapers or sponges, and water-compatible solvent cleaning solutions. Contaminants may be removed with a water or solvent rinse using pressurized or gravity flow, or using steam jets. On metal surfaces, pressurized cleaning may present problems with metals etching compounding the effective removal of contaminants. In addition, caution should be exercised to ensure that pressurized or steam cleaning sprays/emissions are appropriately contained (i.e., curtains, enclosures, or spray booths may be necessary to reduce or eliminate cross-contamination).

Wipe sampling will involve sampling surfaces exposed to either hazardous wastes or the exhaust gases/residuals derived from waste incineration in the above equipment. Samples are collected by applying deionized water or a detergent (e.g., household liquid cleaner) to a piece of 11-cm diameter filter paper (e.g., Whatman 40 ashless, Whatman "50" smear tabs, or equivalent) or gauze pad. This moistened filter paper or gauze pad is used to thoroughly swab a 100-cm² area, as can be measured by a sampling template.

The use of a template can assist the sampler in the collection of a 100-cm² sample. Different templates may be used for the variously shaped areas which must be sampled (e.g., a 10 cm x 10 cm square). When a template is used, it should be thoroughly cleaned between samples to prevent contamination of subsequent samples by the template.

The wipes and the liquid used to wet the wipes should be tested for residual metals before use in taking samples from the incinerator. The wipe samples should be stored in precleaned glass jars and stored no longer than the allowable holding times stated in SW-846. Samples will be digested and analyzed for As, Be, Cd, Cr, Sb, Ba, Hg, Pb, Tl, and Ag (the metals regulated in incinerator emissions). Samples can be composited if desired, but compositing reduces opportunities for identifying localized contamination areas. At least one blank sample per sampling day must be prepared. Wiping only gives an indication of surface contamination which can easily be removed. Incinerator components with a large amount of strongly entrained residuals might need to be scraped with a paint scraper and the scrapings analyzed. Criteria for acceptable levels of residual contamination are discussed below.

As an alternative to step 4, an incinerator owner may elect to dispose all incineration equipment as a hazardous waste.

CERTIFICATION OF ADEQUATE CLOSURE

The effectiveness of the closure decontamination process for organic contamination may be estimated by visual observation of any discolorations, stains, or gross pockets of apparent organic solids. This visual assessment is anticipated to be a suitable measure of possible organic contamination when followed by a rinse or cleanup of the affected areas with an appropriate solvent.

Effectiveness of metals decontamination may be determined by wipe sampling (as previously discussed), or by analyzing rinsate for contaminants left in the solvent solution. However, analysis of rinsate should be evaluated with regards to the total amount of rinsate in contact with the total area of the incinerator surfaces. Rinsate values could be elevated due to a leaching effect on the metallic surfaces of the incinerator. Evidence of elevated levels of contaminants in the wipe samples (as discussed below) suggest that additional cleaning and rinsing is necessary. Elevated contaminate concentrations also may indicate that an alternative contaminate removal method (e.g., sand-blasting, surface sealing, etc.) is necessary to remove or permanently contain contaminates.

Until EPA develops de minimus levels for the metals of concern, a suggested guide is to compare the results of incinerator wipe sampling with background levels as indicated by taking wipe samples of exterior building surfaces on or near the incineration site. This wipe sample should reflect background ambient air quality, including the impact of local mineralogy. An incinerator wipe sample that demonstrates a surface concentration at least 100 times greater than the background value for any metal should serve as an indicator that additional decontamination is needed prior to closure. Failure to meet the criteria would require a repeat of the optional rinse/scrub of equipment (in step 4) followed by a repeat of wipe sampling; disposal of contaminated material as a hazardous waste is another alternative. Care should be taken in selecting areas for background sampling since such materials as painted surfaces and stainless steel may contain significant levels of some of the analytes.

The incinerator owner/operator will submit full documentation of the closure process to the permitting agency to receive certification of closure. A report should be submitted to the Agency describing each step of closure activities and the results of wipe sampling. Certification will allow the owner/operator to recycle the incinerator materials or dispose of the materials as a nonhazardous waste. Alternatively, closure certification may note the adequate disposal of incinerator equipment as a hazardous waste.

DELAY OF CLOSURE

The above approach assumes that the incineration facility is being closed and dismantled. If a facility is being closed as a RCRA facility but will either continue to operate as a nonhazardous waste facility or remain intact in storage for indefinite future operation, step 4 above could be delayed until dismantling occurs. However, the incineration facility will be subject to RCRA security requirements and, ultimately, RCRA closure requirements.

Table 1. SUMMARY OF RCRA INCINERATOR CLOSURE RECOMMENDATIONS

Step 1	Incineration of all remaining waste feeds and removal of all ash and scrubber effluent wastes
Step 2	Flush waste feed lines and mechanisms with kerosene or an equivalent solvent and incinerate rinsate
Step 3	Operate incinerator for at least 4 hr at the minimum permitted temperature with auxiliary fuel only, to provide burnout of any organic residues
Step 4	Optional decontamination of incinerator components with detergent, followed by mandatory wipe sampling of surfaces potentially contaminated with toxic metals (additional decontamination and wipe sampling would be conducted if needed)
Step 5	Certification of adequate closure based upon analytical results

Table 2. GENERAL GUIDE TO SOLUBILITY OF CONTAMINANTS IN FOUR SOLVENT TYPES

Solvent	Soluble contaminants
Water	Low-chain hydrocarbons. Soluble inorganic compounds. Salts. Some organic acids and other polar compounds.
Aqueous Detergents	Many water soluble contaminants and insoluble particulates.
Dilute Acids	Basic (caustic) compounds. Amines. Hydrazines.
Dilute Bases For example: -detergent -soap	Acidic compounds. Phenols. Thiols. Some nitro and sulfonic compounds.
Organic Solvents For example: -alcohols -ethers -ketones -aromatics -straight-chain alkanes (e.g., hexane) -common petroleum products (e.g., fuel oil, kerosene) -chlorinated solvents	Many nonpolar or polar organic compounds.

Attachment 1

THIS LETTER WAS REKEYED TO BE ELECTRONICALLY AVAILABLE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

June 19, 1989

Mr. Thomas C. Jorling
Commissioner
Department of Environmental Conservation
State of New York
Albany, New York 12233-1010

Dear Mr. Jorling:

I am writing in response to your letter of May 5, 1989, in which you ask numerous questions concerning the regulatory status, under the Resource Conservation and Recovery Act (RCRA), of environmental media (ground water, soil, and sediment) contaminated with RCRA-listed hazardous waste.

As you point out in your letter, it is correct that the Agency's "contained-in" interpretation is that contaminated environmental media must be managed as if they were hazardous wastes until they no longer contain the listed waste, or are delisted. This leads to the critical question of when an environmental medium contaminated by listed hazardous waste ceases to be a listed hazardous waste. In your letter, you discuss three possible answers (based on previous EPA positions and documents) which you believe address this question, and request the Agency to clarify its interpretation. Each of these is discussed below.

The first possible answer you cite would be that the contaminated media would be a hazardous waste unless and until it is delisted, based on the "mixture" and "derived-from" rules. As you correctly state in your letter, a waste that meets a listing description due to the application of either of these rules remains a listed hazardous waste until it is delisted. However, these two rules do not pertain to contaminated environmental media. Unlike our regulations, contaminated media are not considered solid wastes in the sense of being abandoned, recycled, or inherently waste-like as those terms are defined in the regulations. Therefore, contaminated environmental media cannot be considered a hazardous waste via the "mixture" rule (i.e., to have a hazardous waste mixture, a hazardous waste must be mixed with a solid waste per 40 CFR 261.3(a)(2)(iv). Similarly, the "derived" from" rule does not apply to contaminated media. Our basis for stating that contaminated environmental media must be managed as hazardous wastes is that they "contain" listed hazardous waste. These environmental media must be managed as hazardous waste because, and only as long as, they "contain" a listed hazardous waste, (i.e., until decontaminated).

The second possibility you mention is that environmental media contaminated with a RCRA listed waste no longer have to be managed as a hazardous waste if the hazardous constituents are completely removed by treatment. This is consistent with the Agency's "contained-in" interpretation and represents the Agency's current policy.

THIS LETTER WAS REKEYED TO BE ELECTRONICALLY AVAILABLE

The third possibility you discuss comes from Sylvia Lawrence's January 24, 1989, memorandum that you cited in your letter. This memorandum indicates that OSW has not issued any definitive guidance as to when, or at what levels, environmental media contaminated with listed hazardous waste are no longer considered to contain that hazardous waste. It also states that until such definitive guidance is issued, the Regions may determine these levels on a case-specific basis. Where this determination involves an authorized State, such as New York, our policy is that the State may also make such a determination.

Related to such a determination, you ask whether a risk assessment approach that addressed the public health and environmental impacts of hazardous constituents remaining in treatment residuals would be acceptable. This approach would be acceptable for contaminated media provided you assumed a direct exposure scenario, but would not be acceptable for "derived-from" wastes under our current rules. Additionally, consistent with the statute, you could substitute more stringent standards or criteria for contaminated environmental media than those recommended by the Federal EPA if you determined it to be appropriate.

The Agency is currently involved in a rulemaking effort directed at setting de minimis levels for hazardous constituents below which eligible listed wastes, treatment residuals from those wastes, and environmental media contaminated with those listed wastes would no longer have to be managed as hazardous wastes. This approach being contemplated in the De Minimis program would be similar to that used in the proposed RCRA Clean Closure Guidance in terms of the exposure scenario (direct ingestion), the management scenario (not in a waste management unit), and the levels (primarily health-based).

Your final question related to whether the "remove and decontaminate" procedure set forth in the March 19,1987 Federal Register preamble to the conforming regulations on closing surface impoundments applies when making complete removal determinations for soil. These procedures do apply when one chooses to clean close a hazardous waste surface impoundment by removing the waste. The preamble language states that the Agency interprets the term "remove" and "decontaminate" to mean removal of all wastes, liners, and/or leachate (including ground water) that pose a substantial present or potential threat to human health or the environment (52 FR 8706). Further discussion of these requirements is provided in a clarification notice published on March 28, 1988, (53 FR 1144) and in OSWER Policy Directive # 9476.00-18 on demonstrating equivalence of Part 265 clean closure with Part 264 requirements (copy enclosed).

I hope that this response will be helpful to you in establishing and implementing New York's hazardous waste policies on related issues. Should you have additional questions, please contact Bob Dellinger, Chief of the Waste Characterization Branch at (202) 475-8551.

Sincerely yours,

(original letter was signed by a representative of Jonathan Cannon)
Jonathan Z. Cannon
Acting Assistant Administrator

ATTACHMENT 3

LIST OF CLOSURE COMPOUNDS OF CONCERN

List of Closure Compounds of Concern

CAS Number	Name	Description	Analysis
100-41-4	Ethylbenzene	Ethylbenzene	8260
100-42-5	Styrene	Styrene	8260
103-65-1	n-propylbenzene	n-propylbenzene	8260
105-67-9	2,4-Dimethylphenol	2,4-Dimethylphenol	8270
106-44-5	4-Methylphenol	4-Methylphenol	8270
106-46-7	1,4, -dichlorobenzene	1,4,-dichlorobenzene	8270
106-93-4	1,2,dibromoethane	Ethylene Dibromide (EDB)	8260
107-06-2	1,2,dichloroethane	EDC	8260
107-13-1	acrylonitrile	acrylonitrile	8260
108-05-4	vinyl acetate	vinyl acetate	8260
108-88-3	Toluene	Toluene	8260
108-90-7	Chlorobenzene	Chlorobenzene	8260
108-95-2	Phenol	Phenol	8270
109-99-9	tetrahydrofuran	tetrahydrofuran	8260
111-44-4	Bis(2-chloroethyl)ether	Bis(2-chloroethyl)ether	8270
117-81-7	bis (2-ethylhexyl) phthalate	bis (2-ethylhexyl) phthalate	8270
120-12-7	Anthracene	Anthracene	8270
120-82-1	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzene	8270
123-91-1	1,4-Dioxane	1,4-Dioxane	8270
124-48-1	Dibromochloromethane	Dibromochloromethane	8260
127-18-4	Tetrachloroethylene	PCE	8260
131-11-3	Demethyl phthalate	Demethyl phthalate	8270
132-64-9	Dibenzofuran	Dibenzofuran	8270
1330-20-7	Xylene	xylene	8260
1912-24-9	Atrazine	2-chloro-4-(ethylamino)-6-(isopropylamino)-	8141
121-75-5	Malathion	Malathion	8141
206-44-0	Fluoranthene	Fluoranthene	8270
208-96-8	Acenaphthylene	Acenaphthylene	8270
218-01-9	Chrysene	Chrysene	8270
309-00-2	Aldrin	Aldrin	8270
319-84-6	Alpha-BHC	Alpha-Hexachlorocyclohexane	8270
78-59-1	Isophorone	Isophorone	8270
51-28-5	2,4,Dinitrophenol	2,4,-Dinitrophenol	8270
541-73-1	1,3-dichlorobenzene	1,3-dichlorobenzene	8270
56-23-5	Carbon Tetrachloride	Carbon Tetrachloride	8260
56-55-3	Benz(a)anthracene	1	8270
57-74-9	Chlordane	Chlordane	8270
58-89-9	Lindane	Lindane	8270
591-78-6	2-Hexanone	2-Hexanone	8260
62-53-3	Aniline	Aniline	8270
67-64-1	acetone	acetone	8260
67-66-3	Chloroform	Chloroform	8260
71-43-2	Benzene	Benzene	8260
71-55-6	1,1,1trichloroethane	1,1,1trichloroethane	8260
72-20-8	Endrin	Endrin	8270
72-43-5	Methoxychlor	Methoxychlor	8270
72-54-8	4.4'-DDD		8270
7429-90-5	Aluminum	Fume or Dust Only	6010

Note: Most recent version of analytical methods will be used.

List of Closure Compounds of Concern

CAS Number	Name	Description	Analysis
7439-92-1	Lead	Lead	6010
7439-96-5	Manganese	Manganese	6010
7439-97-6	Mercury	Mercury	7470
7440-02-0	Nickel	Nickel	6010
7440-22-4	Silver	Silver	6010
7440-36-0	Antimony	Antimony	6010
7440-38-2	Arsenic	Arsenic	6010
7440-39-3	Barium	barium	6010
7440-41-7	Beryllium	Beryllium	6010
7440-43-9	Cadmium	Cadmium	6010
7440-46-4	Copper	Copper	6010
7440-47-3	Chromium	Chromium	6010
7440-48-4	Cobalt	Cobalt	6010
7440-62-2	Vanadium	Vanadium	6010
7440-66-6	Zinc	Zinc	6010
74-83-9	Bromomethane	Bromomethane	8260
74-87-3	chloromethane	methyl chloride	8260
75-00-3	chloroethane	chloroethane	8260
75-09-2	Methylene chloride	Methylene Chloride	8260
75-15-0	Carbon Disulfide	Carbon Disulfide	8260
75-25-2	Bromoform	Bromoform	8260
75-27-4	Bromodichloromethane	Bromodichloromethane	8260
75-34-3	1,1dichlorethane	1,1,dichloroethane	8260
75-35-4	1,1dichloroethene	1,1dichloroethene	8260
75-69-4	Trichlorofluoromethane		8260
75-71-8	Dichlorodifluoromethane	Dichlorodifluoromethane	8260
76-13-1	Freon 113	Freon 113	8260
129-00-0	Pyrene	Pyrene	8270
76-44-8	Heptachlor	Heptachlor	8270
78-87-5	1,2,dichloropropane	1,2,dichloropropane	8260
78-93-3	Methyl ethyl ketone	MEK	8260
79-00-5	1,1,2-Trichloroethane	1,1,2-Trichloroethane	8260
79-01-6	Trichloroethylene	TCE	8260
79-34-5	1,1,2,2,-Tetrachloroethane	1,1,2,2,-Tetrachloroethane	8260
8001-35-2	Toxaphene	Toxaphene	8270
80-62-6	Methyl methacrylate	Methyl methacrylate	8260
82870-81-3	Thallium	Thallium	6010
83-32-9	Acenaphthene	Acenaphthene	8270
84-66-2	Diethylphthalate	Diethylphthalate	8270
84-74-2	Dibutyl Phthalate	Dibutyl Phthalate	8270
85-01-8	Phenanthrene	Phenanthrene	8270
86-73-7	Fluorene	Fluorene	8270
87-68-3	1,3 - Hexachlorobutadiene	1,3-Hexachlorobutadiene	8270
87-86-5	Pentachlorophenol	PCP	8270
88-74-4	2-Nitroaniline	2-Nitroaniline	8270
91-20-3	Naphthalene		8270
91-57-6	2-Methylnaphthalene	2-Methylnaphthalene	8270
95-47-6	o-Xylene	o-Xylene	8260

Note: Most recent version of analytical methods will be used.

List of Closure Compounds of Concern

CAS Number	Name	Description	Analysis
95-48-7	2-Methylphenol	2-Methylphenol	8270
95-50-1	1,2, dichlorobenzene	1,2 dichlorobenzene	8270
95-63-6	1,2,4,trimethylbenzene	1,2,4,trimethylbenzene	8260
96-18-4	1,2,3,trichloropropane	1,2,3,trichloropropane	8260
98-86-2	Acetophenone	Acetophenone	8270
98-95-3	Nitrobenzene	Nitrobenzene	8270
99-09-2	3-Nitroaniline	3-Nitroaniline	8270

Note: Most recent version of analytical methods will be used.

ATTACHMENT 4

RCRA FACILITY CLOSURE COST ESTIMATE

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Facility Closure Cost Estimate

Date: April 2012

Item/Activity	Number	Units	Cost per unit	Associated Item/Activity Cost
REMOVAL OF REACTIVATED CARBON STORED AT SITE				
Loading bags of reactivated carbon on trucks for transport to another Siemens facility for sale or re-use. (3,000 bags) 40 bags/hour x $30/hour x 2 people)	150	manhours	$30	$4,500
Shipping of bags (3,000 bags) 40 bags/truckload x $1,500/truckload)	75	truck loads	$1,500	$112,500
				$117,000
CONTAINER STORAGE AREA CLOSURE COSTS				
Transfer spent carbon to trucks for off-site shipment for incineration (1,818 containers) 80 containers/hour x $30/hour x 2 people)	45.45	manhours	$30	$1,364
Shipping containers of spent carbon for off-site incineration (1,818 containers ¸ 176 containers/truckload x $4,000/truckload) (Rounded up to 11 truckloads)	11	truck loads	$4,000	$44,000
Off-site incineration of spent carbon ($0.55/lb x 360,000 lb)	360000	lb	$0.55	$198,000
Decontamination of Container Storage Area 24 man hours x $30/hour	24	manhours	$30	$720
Rental of Decontamination Equipment 3 days x $100/day	3	days	$100	$300
Disposal of rinsate at POTW (5,600 sq. ft. x 2 gal/sq. ft. x $0.0025/gal x 3 rinses)	33600	gallons	$0.0026	$86
One sample of rinsate (plus MS/MSD for QC) will be required for one small equipment batch, at $1,010 each (3 samples, metals & organic COCs)	3	samples	$1,010	$3,030
Supervision and management (includes PPE and incidentals) 200 hours x $50/hour	200	manhours	$50	$10,000
				$257,499
TANK CLOSURE COSTS				
Transfer of spent carbon from tanks to trucks for off-site incineration (8 hours/tank x 5 tanks x $30/hour x 2 people)	80	manhours	$30	$2,400
Shipping of bulk spent carbon for off-site incineration (300,000 lb carbon ¸ 40,000 lb/truck x $4,000/truckload (Rounded up to 8 truckloads)	8	truck loads	$4,000	$32,000
Off-site incineration of spent carbon ($0.55/lb x 300,000 lb)	300000	lb	$0.55	$165,000
Removal of ancillary equipment 120 hours x $30/hour x 2	240	manhours	$30	$7,200
Decontamination of ancillary equipment 120 hours x $30/hour x 2	240	manhours	$30	$7,200
Rental of Decontamination Equipment 15 days x $100/day	15	days	$100	$1,500
Disposal of rinsate from ancillary equipment at POTW	1	disposal	$1,000	$1,000
One sample of rinsate (plus MS/MSD for QC) will be required for small equipment from each tank system at $1,010/sample (5 tank systems x 3 samples) (metals & organic COCs)	15	samples	$1,010	$15,150
Supervision and management 100 hours x $50/hour	100	manhours	$50	$5,000
Shipment of ancillary equipment offsite as scrap metal (3 loads x $575/load)	3	truck loads	$575	$1,725
Tank decontamination 5 tanks x 4 hours/tank x $30/hour x 3 people	60	manhours	$30	$1,800
Rental of decontamination equipment 5 days x $100/day	5	days	$100	$500
Decontamination of tank containment 24 man hours x $30/hour	24	manhours	$30	$720
Disposal of rinsate at POTW	1	disposal	$1,000	$1,000
Disassembly of tanks (80 manhours/tank x $50/hr x 5 tanks)	400	manhours	$50	$20,000
Shipment of tanks offsite for scrap metal (5 loads x $575/load)	5	truck loads	$575	$2,875
Supervision and management (includes PPE and incidentals) 40 hours x $50/hour	40	manhours	$50	$2,000
				$267,070
CARBON REACTIVATION UNIT CLOSURE COSTS				
Operation of RF-2 (empty) at permit temperatures for organic decontamination (4 hours x $500/hr)	4	hours	$500	$2,000
RF-2 afterburner refractory removal (150 manhours x $50/hr)	150	manhours	$50	$7,500

Facility Closure Cost Estimate

Date: April 2012

Item/Activity	Number	Units	Cost per unit	Associated Item/Activity Cost
Disposal of refractory ($500/yd x 20 yd/macro box x 4 boxes)	80	yards	$500	$40,000
Carbon reactivation unit decontamination (RF-2, afterburner, Quench/Venturi, Packed Bed scrubber, WESP, ID Fan, Stack) (6 equipment items x 16 hours/items x $50/hour x 3 persons)	288	manhours	$50	$14,400
Rental of decontamination equipment 12 days x $100/day	12	days	$100	$1,200
Disposal of rinsate at POTW	1	disposal	$1,000	$1,000
One sample of rinsate (plus MS/MSD for QC) will be required for each of 3 small equipment batches at $245/sample (3 batches x 3 samples, metals only)	9	samples	$245	$2,205
Decontamination of carbon reactivation unit containment 24 man hours x $30/hour	24	manhours	$30	$720
Disposal of rinsate at POTW	1	disposal	$1,000	$1,000
Disassembly of carbon reactivation unit (RF-2, afterburner, Quench/Venturi, Packed Bed scrubber, WESP, ID Fan, Stack) (480 manhours x $50/hr)	480	manhours	$50	$24,000
Rental of 70 Ton Crane (Crane @ $200/hr and Rigger @$55/hr) 480 hours @ $255/hour (includes 1 hour mobilization/1 hour demobilization)	480	hours	$255	$122,400
Removal of Unit for Scrap Metal Recycling 80 hours/unit x $30/hour x 3 Persons	240	manhours	$30	$7,200
Shipment of disassembled carbon reactivation unit offsite for scrap metal (6 loads x $575/load)	6	truck loads	$575	$3,450
Supervision and management (includes PPE and incidentals) 120 hours x $50/hour	120	manhours	$50	$6,000
Transportation and disposal of PPE, Sampling Equipment, etc. 10 drums at $1,000/drum	10	drums	$1,000	$10,000
				$243,075
SOIL INVESTIGATION				
Concrete/soil boring (including mobilization, permits, labor, boring, Geoprobe, auger, geologist) (16 borings x $350/boring)	16	borings	$350	$5,600
48 samples (16 locations at 3 depths each) plus MS/MSD for QC at $1010/sample (50 samples, metals & full-scan volatile and semivolatile organics)	50	samples	$1,010	$50,500
				$56,100
BACKGROUND/BASELINE SAMPLE ANALYSIS				
3 samples of un-used decontamination water (plus MS/MSD for QC) at $1010/sample (5 samples, metals & organic COCs)	5	samples	$1,010	$5,050
3 samples of soil borings (at 3 depths each) from areas outside operational boundary (plus MS/MSD for QC) at $245/sample (11 samples, metals only)	11	samples	$245	$2,695
				$7,745
FOLLOW-UP SOIL BORINGS AND SAMPLE ANALYSIS (ONLY IF CONTAMINATION FOUND)				
Concrete/soil boring (including mobilization, permits, labor, boring, auger, sampler, geologist) (3 borings to groundwater x $5,000/boring)	3	borings	$5,000	$15,000
15 samples of soil borings (3 locations at 5 depths each) plus MS/MSD for QC at $1010/sample (17 samples, metals & full-scan volatile and semivolatile organics)	17	samples	$1,010	$17,170
				$32,170
DEBRIS TREATMENT (MACROENCAPSULATION) CLOSURE COSTS				
Macroencapsulation Box Disposal $500/yard x 20 yards/box x 10 Boxes	200	yards	$500	$100,000
Transportation 700 Miles x $2.75/mile x 10 Boxes	7000	box-miles	$2.75	$19,250
				$119,250
REMOVAL OF EQUIPMENT LEFT ON-SITE AFTER RF-1 PARTIAL CLOSURE				
RF-1 furnace removal	1	removal	$8,520	$8,520
RF-1 Afterburner (AB-1) removal	1	removal	$7,020	$7,020
Tank T-8 removal	1	removal	$7,020	$7,020
				$22,560
SAMPLING COST				
5 Sampling events x 8hr/event x $30/hr	40	manhours	$30	$1,200
Sampling equipment/supplies	1	equip	$300	$300
				$1,200
PROFESSIONAL ENGINEER CERTIFICATION AND REPORT				
Professional Engineer certification and report	1	report	$20,000	$20,000
				$20,000

Facility Closure Cost Estimate

Date: April 2012

Item/Activity	Number	Units	Cost per unit	Associated Item/Activity Cost
Subtotal Closure Costs (Container Storage Area, Tanks, and Carbon Reactivation Unit)				$1,143,969
Project Management, Engineering, Planning (10%)				$114,397
Estimated Total Closure Costs (No Contingency)				$1,258,366
Contingency (15%)				$188,755
GRAND TOTAL CLOSURE COST ESTIMATE				**$1,447,121**